Rock Products

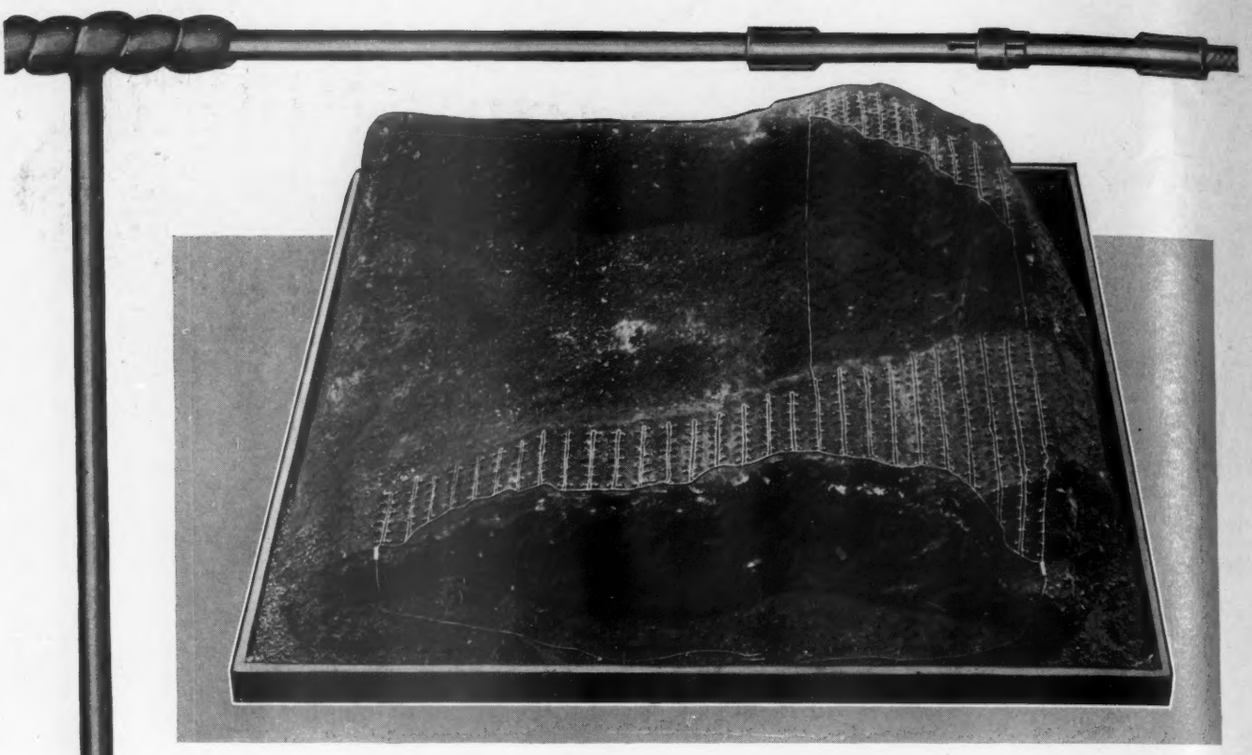
with which is incorporated

CEMENT and ENGINEERING NEWS

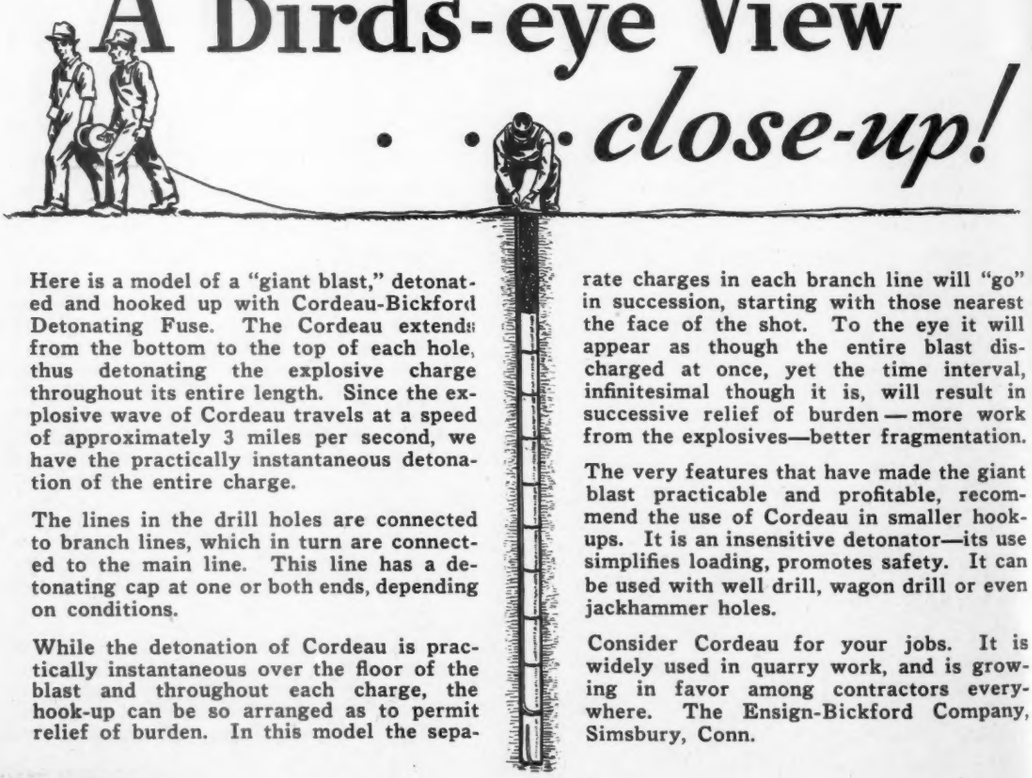
November 1934

Founded 1896

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY



A Bird's-eye View . . . close-up!



Here is a model of a "giant blast," detonated and hooked up with Cordeau-Bickford Detonating Fuse. The Cordeau extends from the bottom to the top of each hole, thus detonating the explosive charge throughout its entire length. Since the explosive wave of Cordeau travels at a speed of approximately 3 miles per second, we have the practically instantaneous detonation of the entire charge.

The lines in the drill holes are connected to branch lines, which in turn are connected to the main line. This line has a detonating cap at one or both ends, depending on conditions.

While the detonation of Cordeau is practically instantaneous over the floor of the blast and throughout each charge, the hook-up can be so arranged as to permit relief of burden. In this model the separate charges in each branch line will "go" in succession, starting with those nearest the face of the shot. To the eye it will appear as though the entire blast discharged at once, yet the time interval, infinitesimal though it is, will result in successive relief of burden — more work from the explosives—better fragmentation.

The very features that have made the giant blast practicable and profitable, recommend the use of Cordeau in smaller hook-ups. It is an insensitive detonator—its use simplifies loading, promotes safety. It can be used with well drill, wagon drill or even jackhammer holes.

Consider Cordeau for your jobs. It is widely used in quarry work, and is growing in favor among contractors everywhere. The Ensign-Bickford Company, Simsbury, Conn.

The Cordeau Book gives diagrams, photographs and a factful story of this new technique in blasting. Free to executives.

CORDEAU
DETONATING FUSE
BICKFORD

CB-36

Recognized the World Over as the Leader in Its Field

Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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(Issued Monthly)

November, 1934

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Telephone Harrison 1422-23

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The A. B. P. is a nonprofit organization whose members have pledged themselves to a working code of a practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products. The A. B. C. is an organization which audits and verifies publishers' circulation claims and records.

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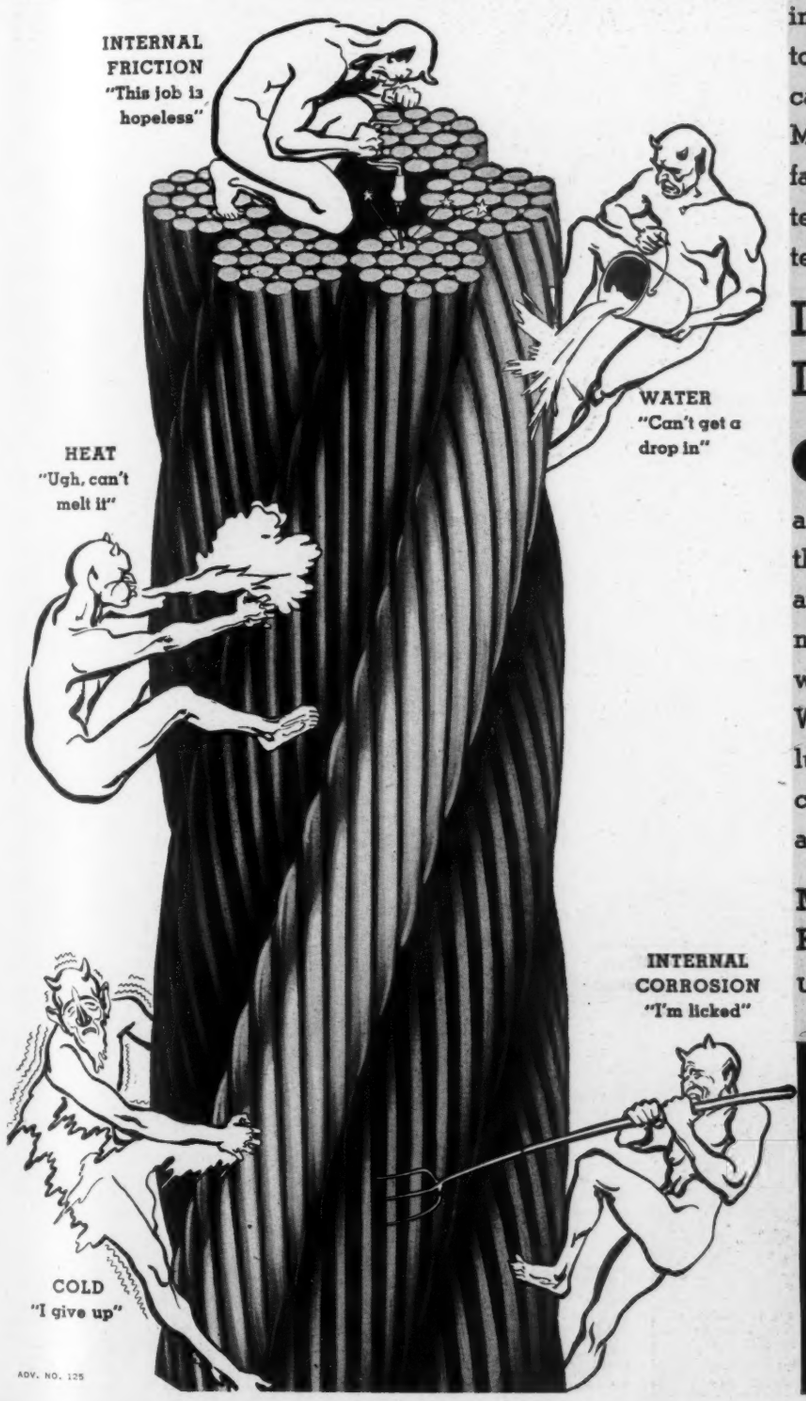
from their damaging wear and tear



● Internal corrosion, internal friction, heat, cold, water—these destructive imps are constantly on the job ready to attack ordinary wire rope. But they can't get inside Macwhyte Wire Rope. Macwhyte Wire Rope, including the famous Monarch Whyte Strand, is protected from their damaging wear and tear by a special kind of

INTERNAL LUBRICATION

● The spaces between all the wires of each strand are packed full of a lubricant which is not affected by the hottest or coldest climatic temperatures. Water and ordinary acids do not hurt it. More and more buyers of wire rope are specifying Macwhyte Wire Rope because its special internal lubrication lengthens service, lowers cost. Write for complete information and performance records.

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KENOSHA, WISCONSIN

Use Monarch Whyte Strand—PREFORMED—for maximum service.

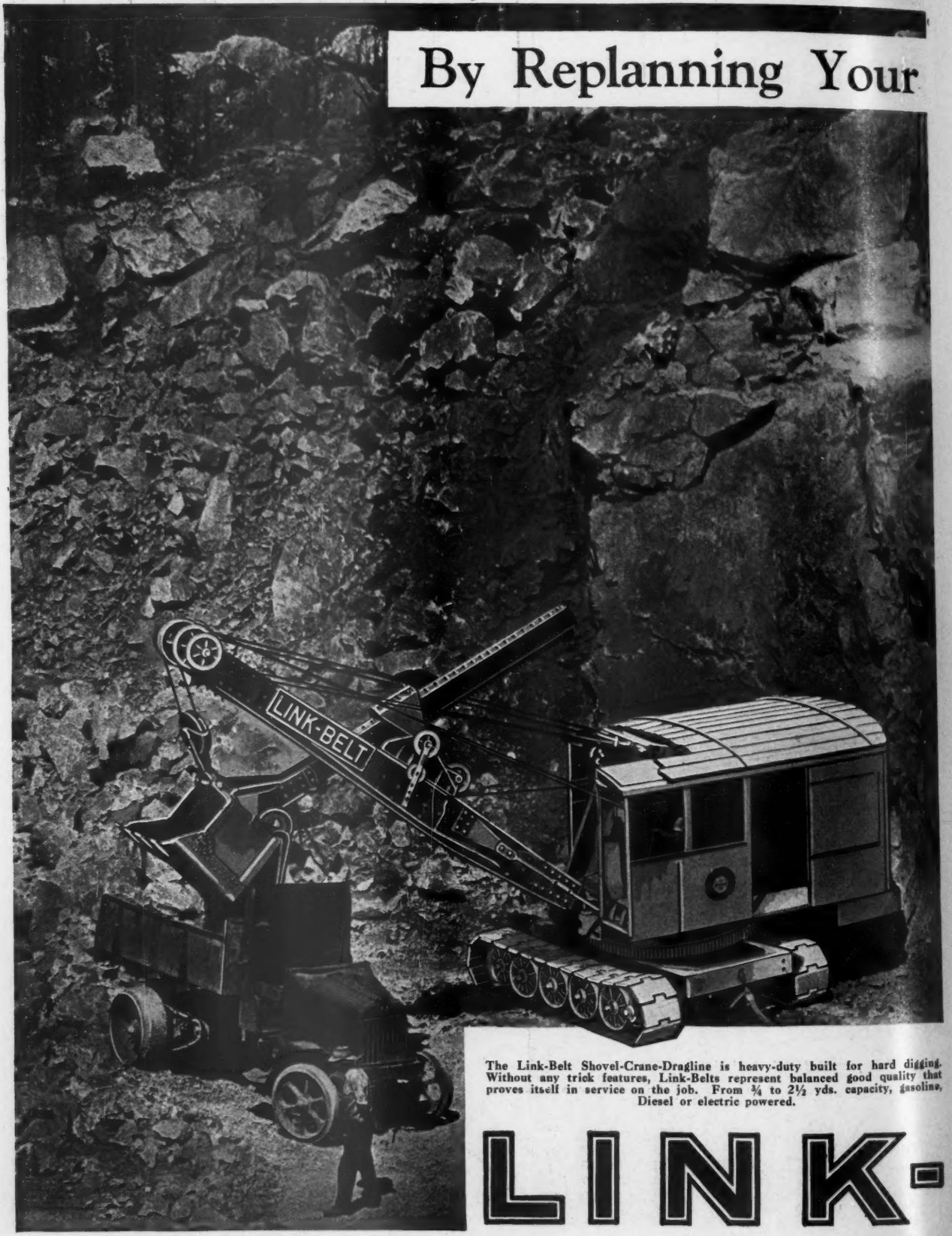
MACWHYTE WIRE ROPE

Internally Lubricated

Both Macwhyte Preformed and Non-Preformed Ropes are internally lubricated

Meet Today's Markets

By Replanning Your



The Link-Belt Shovel-Crane-Dragline is heavy-duty built for hard digging. Without any trick features, Link-Belts represent balanced good quality that proves itself in service on the job. From ¾ to 2½ yds. capacity, gasoline, Diesel or electric powered.

LINK-

A complete Link-Belt sand and gravel washing plant.

Handling and Preparation

The Link-Belt Vibrating Screen. A triumph of mechanical vibration.

IN the face of today's competition only those producers whose plants are thoroughly modernized will operate at a profit. Bring your plant up to the best competitive level that modern facilities will permit.

This does not necessarily mean that you will have to redesign completely. Possibly a rearrangement or adjustment in layout, or an additional unit or replacement here and there, will be all that is required.

Put up to Link-Belt the responsibility for the balanced arrangement and correct application of the right equipment and methods to meet your requirements. For washing, screening, sizing, conveying, elevating, mixing, or excavating, there is a variety of equipment in the Link-Belt line to meet every requirement. Unbiased selection of the right unit and correct layout to give exactly the desired results, is assured.

Can your present methods be improved?

Link-Belt manufactures every approved type of conveying equipment, such as belt, apron, bucket, screw, flight, and other types.

Link-Belt screens include: inclined conical, vibrating, rotary disc grizzlies, bar, rotary—all types, for every service.

LINK-BELT COMPANY

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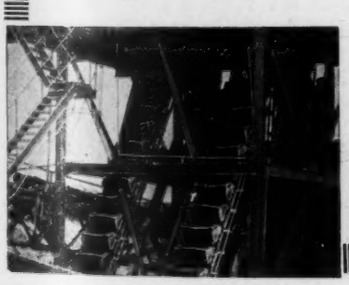
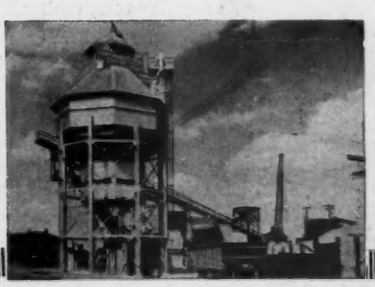


Elevators of all types and capacities, portable loaders, skip hoists, etc.



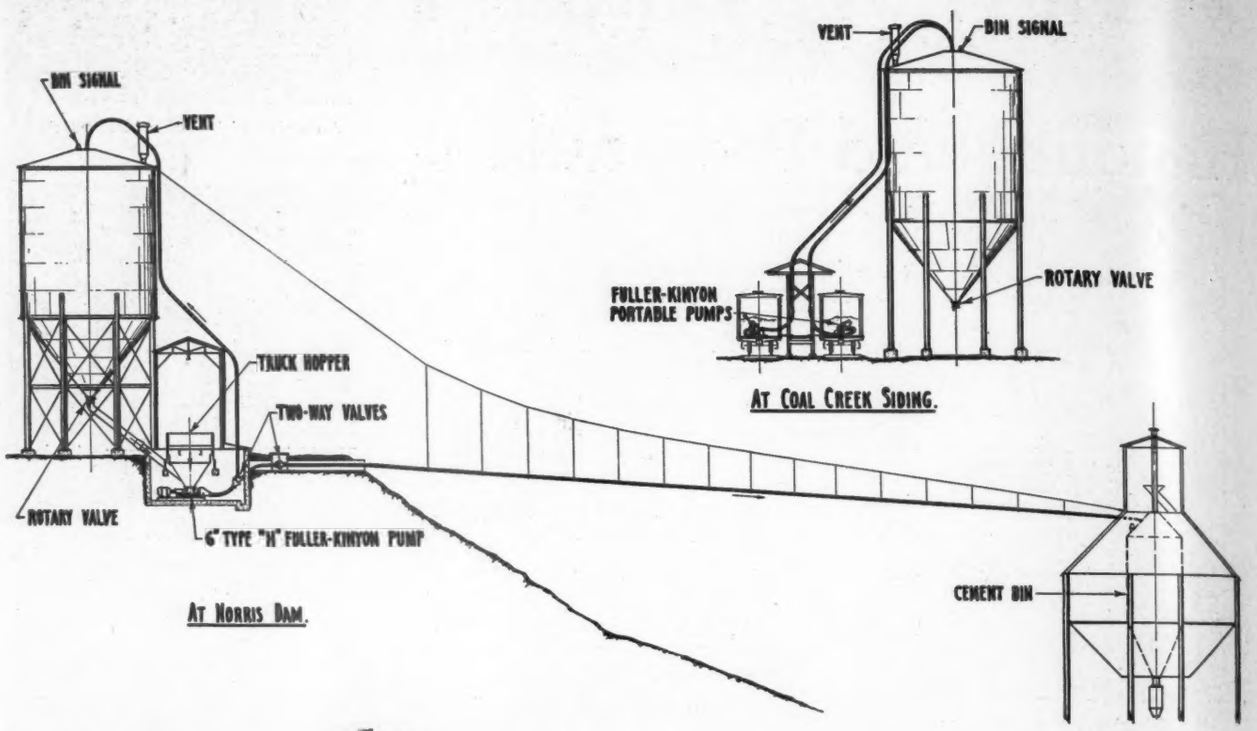
Complete equipment for central concrete mixing—elevators, conveyors, unloading shovels, feeders, etc.

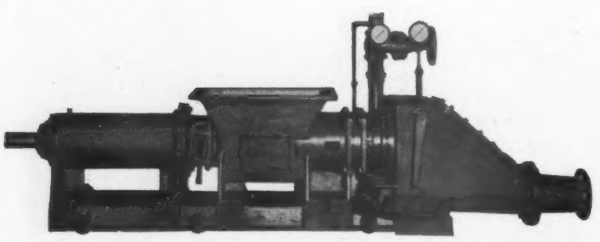
Link-Belt steel apron feeder for aggregates in central concrete mixing plant.

BELT

Elevating—Conveying—Screening—Washing—Excavating Equipment

HANDLING THE CEMENT FOR NORRIS DAM





The new Type "H" Fuller-Kinyon Pump is the most economical conveyor for transporting cement from hopper-bottom cars, truck hoppers and storage bins. It will convey cement far beyond the practical limits of mechanical systems. It is reliable and the accessibility of its parts avoids delaying the mixers. It is directly driven by gas engines or electric motors.

The improved portable Fuller-Kinyon Pump is the only conveyor capable of unloading box-cars and barges, and conveying cement to the mixers from the floors of storage sheds. These features, together with the layout flexibility of the pipe-line system make it possible to meet the conditions of future jobs.

Advantage has again been taken of the unique features of Fuller-Kinyon Pumps to design the cement handling plants at Norris Dam for economy, speed and reliability. At the unloading station, two portable Fuller-Kinyon Pumps unload box-cars and deliver the cement to a truck-loading bin. The present arrangement provides for the unloading of four cars without transfer and when the demand for concrete increases, the platform and pipe-lines will be lengthened to accommodate more cars.

At the Dam, dump trucks discharge into a hopper over two stationary pumps of the type illustrated, one of which is for stand-by service. The cement is conveyed either direct to the mixing plant or elevated to a storage bin from which it is spouted to the pump hopper for transfer to the plant.

Fuller-Kinyon Cement Pumps were selected for the World's greatest dams, bridges, buildings and other concrete structures, as well as an impressive list of modest jobs. The reasons will be apparent from our fully illustrated bulletin. Write for a copy.

Fuller Company
CATASAUQUA, PENNA., U. S. A.

Chicago: 1118 Marquette Bldg.
Paris: E. Constantin, 105, Rue Lafayette
Hamburg: Claudius Peters, Walhoff, Glockengiesserwall 2.

TWELVE CUSTOMERS WROTE THIS AD ABOUT OUR BELL HEADS AND CONCAVES

Nothing we could say would improve it — Nothing we could add would make it more emphatic!

We made a change on our 6" McCully crusher. This machine previously crushed to 1¼ ring. By installing new Traylor Bell head and Concaves we are able to crush the same capacity through a 3/4" ring. We made no change in the horse power on account of these changes. I am well satisfied with the capacity and the product and think that the change was justified.

About six months ago we equipped our #5 McCully crusher with bell head and curved concaves. Prior to that time we were unable to crush our product below 2" at a capacity of about 20 to 25 tons per hour. Now we are crushing our material down to about 1¼ and it is handling our capacity satisfactorily. The Horsepower used by this machine has not been changed, the same 30 H.P. motor driving it.

We revamped our #10 Superior McCully in 1932 with Traylor Bell head fittings. Since that time we have been crushing our stone to 1" and under. This same crusher before revamping would not crush stone smaller than 1-1/2". We are using same horsepower motor, 30 H.P. The capacity of our plant is 1000 tons in ten hours.

Before installing the Traylor fittings in the #6 Crusher we used this as well as a #4 and a #5 crusher for our redrushing, all machines being set for making 2½" stone. After installing the bell head fittings we found that we could do the same work without using the #5 crusher at all. The #6 and the #4 now keep the stone away at all times. before installing the Traylor fittings and with the three crushers running we often had to wait 15 to 20 minutes for the recrushers to catch up. As to the power, we use the same motor we had on the #6 before putting in the new fittings and it seems to handle the load just as well as it did before. We of course save on power considerably from the fact that we do not run the #5 motor at all. We have a 60 H.P. motor on the #6 and a 40 H.P. on the #5.

We do not hesitate to say that we are well pleased with the results we have received from our change of equipment on this crusher.

We purchased a set of Bell Head fittings one year ago this month. They have proven satisfactory because it is not now necessary to have a return chute to take care of the oversize. We ordered a setting of 1½". We did not change the speed of drive, which is the established speed recommended for an Austin #5. The feed to this crusher is from a 7½ Austin 6" down. It has not slowed up the feed of the 7½ from the pit. There is no doubt in my mind that the Bell Head fittings are a great improvement for crushers now installed.

The Voice of Approval

The Bellhead and Concaves which we installed in our #4 Austin Crusher this year have given very satisfactory service. The product obtained is more nearly that for which the crusher was set and all oversize rock is reduced with one handling whereas with the old style concaves and head it was frequently necessary to run some of this oversize through the crusher two to three times before it would pass the screens. The capacity of the crusher is greater and does the crushing much easier and with seemingly less power consumption. We are very much pleased with this installation and hope to equip the gyratory crushers at all our plants with the Bell heads and Curved Concaves.

The Bell Head and Concaves which you furnished us for our #5 Austin crusher, did all you claimed. We are able to crush to small sizes without choking this machine. Our capacity has been greatly increased all without any increase in electric energy.

We have had no trouble with this crusher at all since these parts were installed in July, 1933.

We have two Traylor 10" Finishing Crushers. With standard straight head and concaves the closest setting that could be made on these machines was 1½" and at that setting each had a capacity of from 90 to 95 tons per hour and required approximately 80 H.P. We have had these two machines fitted with curved heads and concaves and are now operating them with a setting of approximately 1-1/8" on the closed side at a capacity of slightly over 80 tons per hour, taking about 75 H.P. for their operation.

Several years ago we installed Bell Head fittings in a 6" Traylor finishing crusher. Before installing these fittings the crusher was producing approximately 30 tons per hour of material passing 1-1/4" round openings. 20% of this product was finer than 1/4". The feed's size was 3-1/2", max. Since installing the Bell Head fittings we increased the capacity of the crusher to 50 tons per hour, passing 1-1/4" round openings, of which about 10% is finer than 1/4".

I am writing in regard to the Bell Head and concaves which we installed in our 6" Allis-Chalmers McCully fine reduction crusher in which we had previously installed non-choking concaves. After putting in your equipment we were able to get double the amount of 3/4" material, no material increase in fines, and gradation was very much better. We are very much pleased with the equipment and intend to install the Bell Head and concaves in our 10" Allis-Chalmers McCully fine reduction crusher.

We are very well satisfied with the revamped crusher. We have used it for two seasons and feel that that length of time is a good test for it. We are producing 1-1/2" product having a large percentage of quite hard granite. This is the same size we produced before the Bell Head was installed but we are producing about 40 tons per hour now as compared with 20 before. We use a 20 H.P. motor.

We revamped a #5 Gates crusher about five years ago, and an 8" McCully crusher in 1931, with the Traylor Bell Head fittings. We crush the material to 1" down size. We did not change the size of the motors running the crushers for the increased tonnage these crushers gave us and we had no trouble with the crushers choking. The new Bell Head fittings have given us entire satisfaction and we have two more crushers which we intend to equip with these fittings.

Write for our Bulletins 111 and 2110

TRAYLOR ENGINEERING & MANUFACTURING CO.
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"ED" AND "RED" TALK OVER THE NEW MARION LINE

"IF YOU WANT TO KNOW *what* EASY STEERING REALLY MEANS, *Ed* . . .

. . . get behind the controls of this clutch type MARION. There's a real treat in store for you. Not only does it steer with the cab in any position . . . but it does it smoother, speedier and with the least effort of any shovel I have ever operated . . . and that goes for ease of operation too."

"That's saying a lot, Red."

"No it isn't! Once you try it, you will agree that running a MARION clutch type shovel is as much pleasure as driving your own automobile to a picnic."

• *ALL operating controls on MARION CLUTCH TYPE EXCAVATORS are centrally located within easy reach of the operator at his station within the full-vision cab. To operate them for boom hoisting or lowering, crowding in or out, hoisting or lowering the dipper, for steering backward or forward in any position, in applying the brakes, and in the general movement of the shovel, requires a minimum of effort . . . in return for smooth, speedy and dependable performance.*

WRITE FOR BULLETIN DESCRIBING THE SIZE IN WHICH YOU ARE PARTICULARLY INTERESTED

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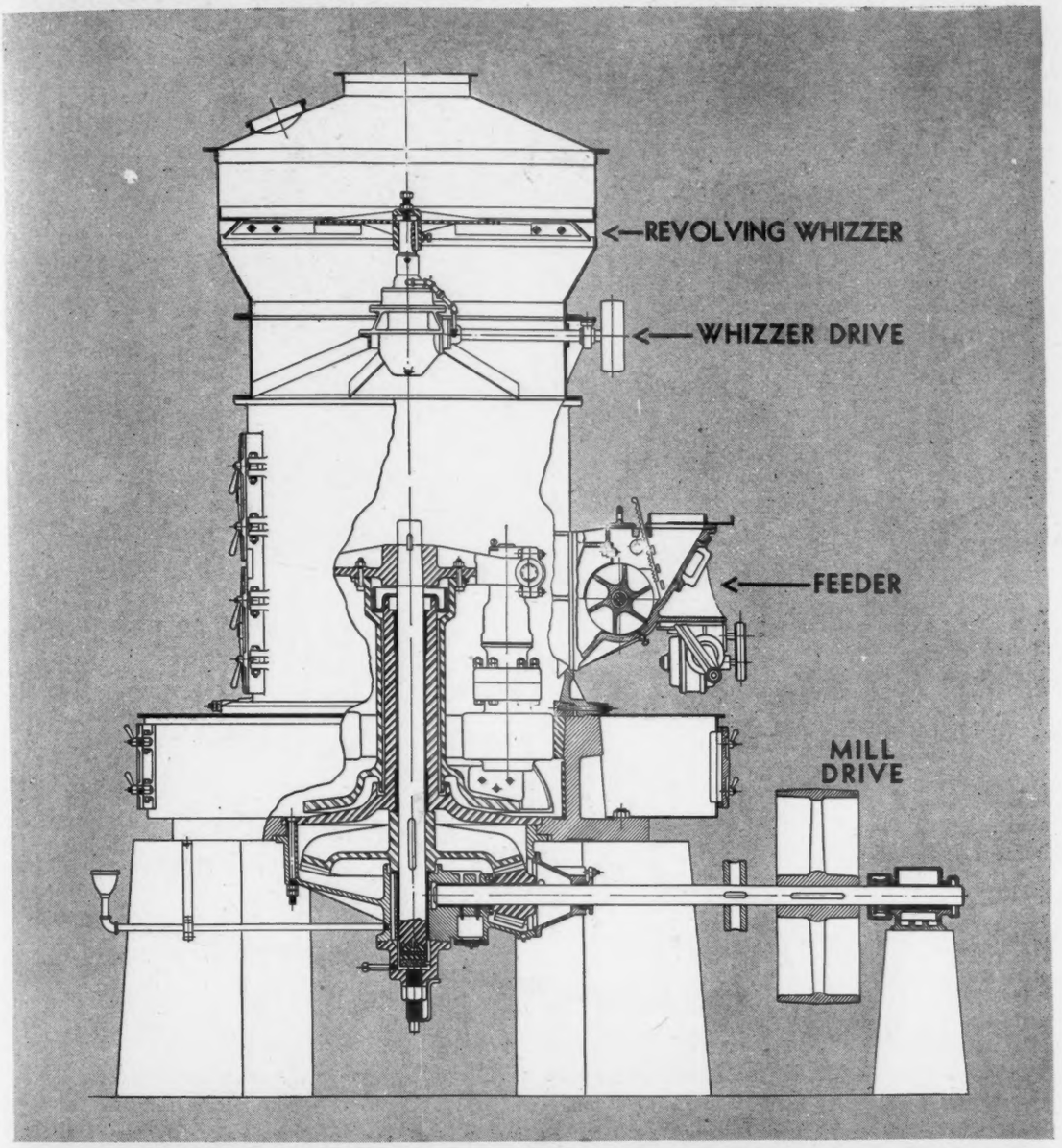
MARION, OHIO, U. S. A.

ELECTRIC • GASOLINE • DIESEL • STEAM • GAS ELECTRIC • DIESEL ELECTRIC • SHOVEL • CLAMSHELL • DRAGLINE • TRENCH SHOVEL

Fineness—under instant control



ROLLER MILL WITH WHIZZER

RAYMOND now offers a combination unit, giving a wide range of classification from about 80% through 100-mesh up to 99.95% passing 325-mesh. The changes in fineness can be made instantly, by means of a variable transmission connecting motor drive with the whizzer. This special application of the whizzer mechanism—first patented and used in the Mechanical Air Separator—is the latest important development in roller mill equipment. Output nearly doubled by substituting Whizzer-equipped Roller Mills in recent installations. Get the facts about this economical method.

RAYMOND BROS. IMPACT PULVERIZER CO., 1307 No. Branch Street, CHICAGO. Sales Offices: in New York and Los Angeles.

Since 1887

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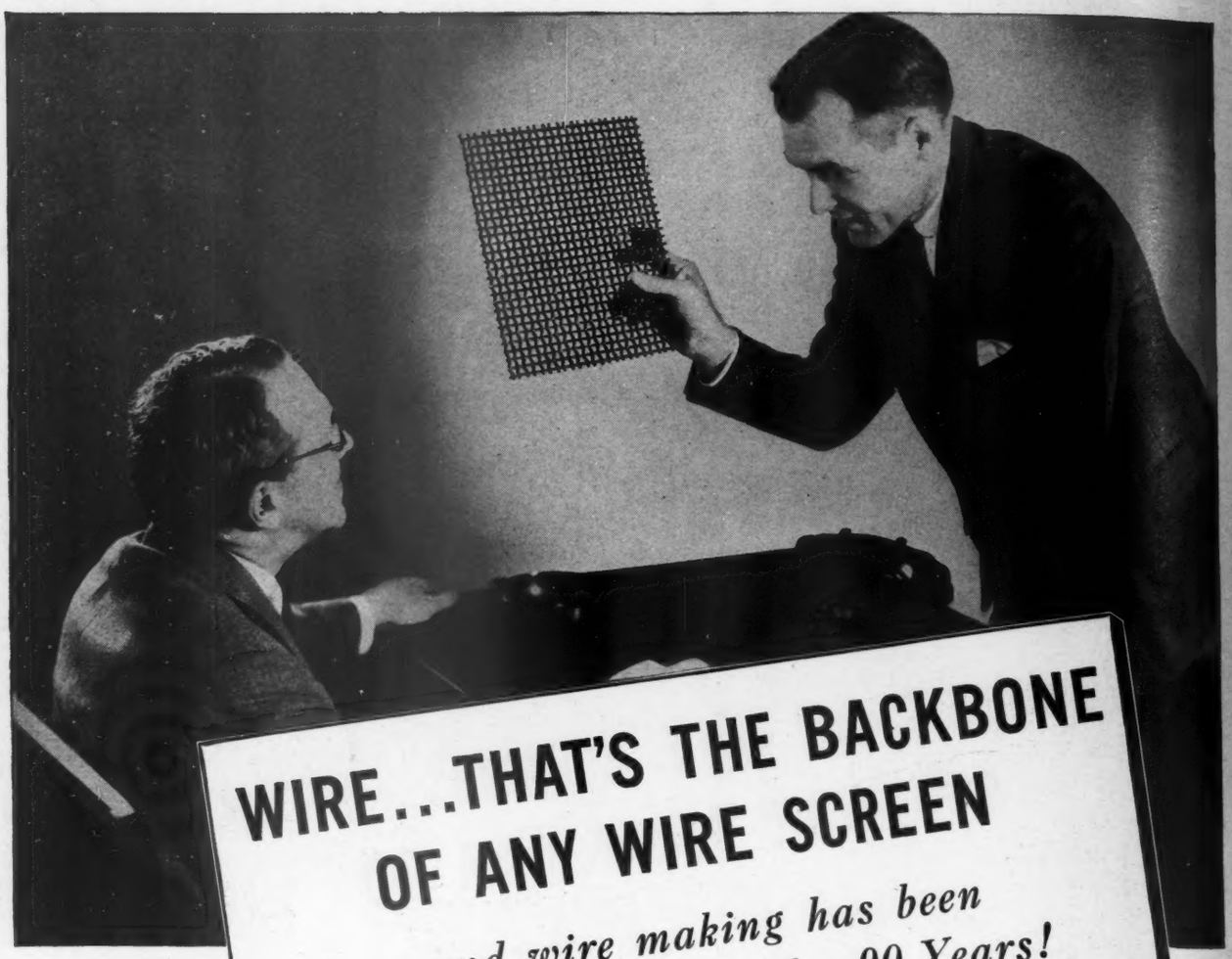


WIRE...THAT'S THE BACKBONE OF ANY WIRE SCREEN

...and wire making has been Roebling's business for 90 Years!

WHEN a Roebling man talks about wire screen, he begins with "wire". For that is the very backbone of the product. Upon the use of the right wire depends the solution of most screen problems. In fact, it often determines screening costs.

Particularly when wire quality is an important factor, Roebling is able to render exceptional assistance to screen users. For the making of high quality wire and wire products is Roebling's business...has been for *over 90 years.*

Roebling's 54 years of experience in producing wire screen for widely diversified needs also works to the advantage of the Rock Products industries. It enables Roebling to fully understand screening problems and service conditions, and to meet them.

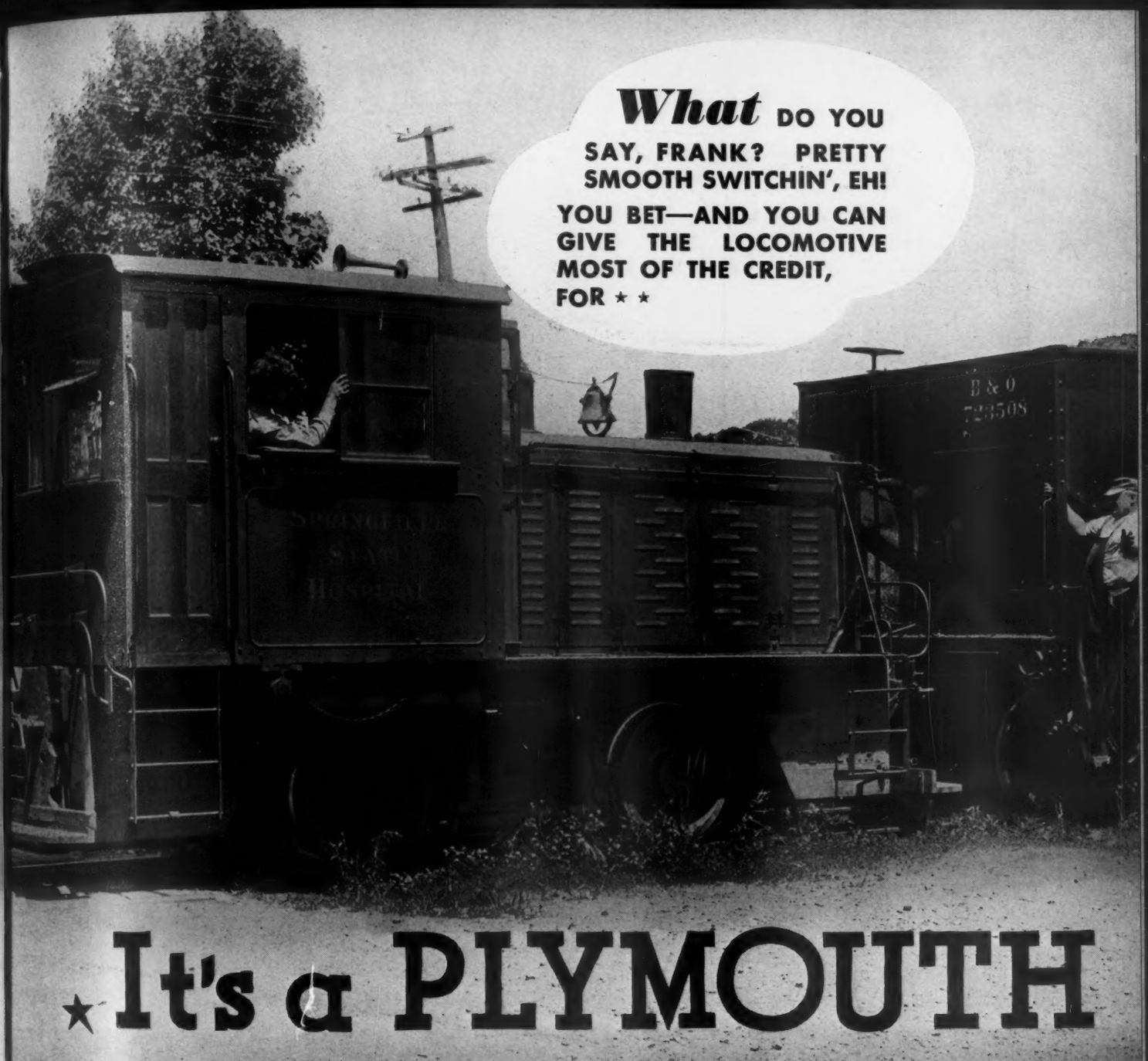
Get our recommendations on Roebling Wire Screen for your particular service. Take advantage of Roebling's ability to produce screen to meet severe durability and efficiency requirements. We would be glad to receive your inquiry and request for samples.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY



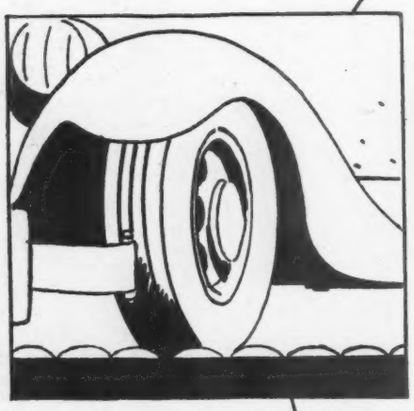
★ It's a PLYMOUTH

Last year, this 35-ton PLYMOUTH GASOLINE LOCOMOTIVE, owned by Springfield State Hospital, Sykesville, Md., switched and hauled 348 carloads of coal and supplies over a 2½-mile private road without a sign of delay. Talk about saving money, say—when a Plymouth Locomotive replaced a steamer, as this one did, you can't help saving money. You save the cost of firing . . . and labor . . . and all the money it takes to keep the old locomotive in running condition. Remember—you can do better work with a gasoline locomotive if IT'S A PLYMOUTH.

BULLETIN ★ free UPON REQUEST

★ *Bulletin ML contains a complete description of the Plymouth Locomotive illustrated above. Mechanical details and specifications are also included. Send for your FREE COPY today. No obligation whatever.*

PLYMOUTH LOCOMOTIVE WORKS, PLYMOUTH, OHIO, U. S. A.



WEAR RESISTANCE

IN tires it's the rubber. In Timken Rock Bits it's the steel. One tire outwears another because it better resists the abrasive effects and shocks of the road. Timken Bits give more footage because Timken fine-grained electric-furnace steel offers greater resistance to rock abrasion and drill impact.

Combined with the Timken removable feature which eliminates reforging expense, Timken Steel cuts drilling costs in any kind of rock—above or below ground. A reasonable trial will prove it to you. Write for further information.

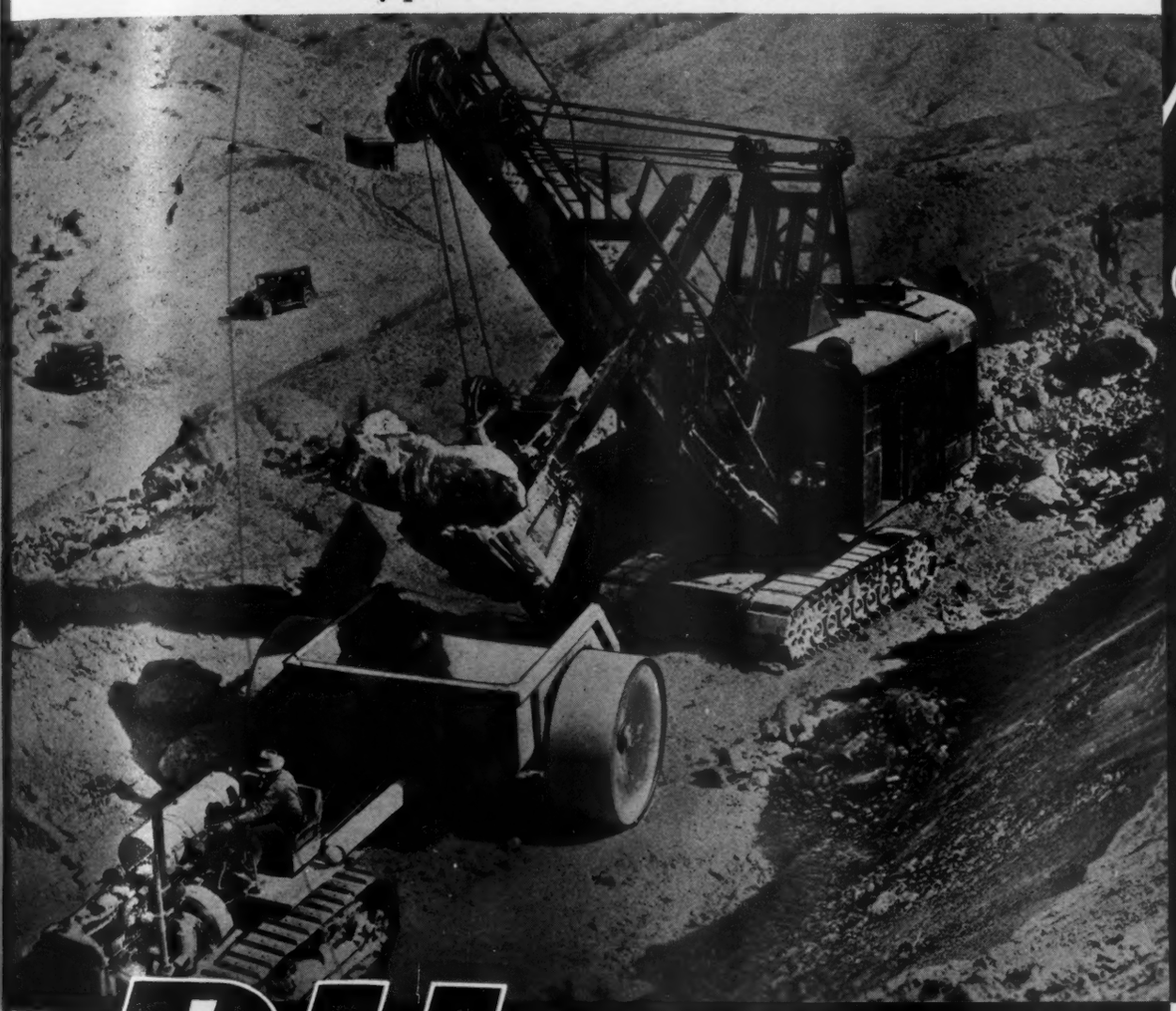
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS

from jobs like this

comes the evidence to show how P&H shock absorbing construction cuts upkeep and boosts yardage

ON jobs that punish a shovel, any man will thank his lucky stars he stuck to a P & H. New type Split Second Control clutches absorb the shocks, minimize breakage, reduce upkeep. You can be sure of steady production — week in and week out — with a P & H.



HAVE you seen the way P&H Split Second Control works? Have you felt the way it smooths out shocks — how it speeds up digging cycles? We'll be glad to show you a P&H at work.

P&H

HARNISCHFEGER CORPORATION

4465 W. NATIONAL AVE. *Established 1884* MILWAUKEE, WIS.

Warehouses and Service Stations:

HOBOKEN MEMPHIS JACKSONVILLE SEATTLE DALLAS
LOS ANGELES SAN FRANCISCO

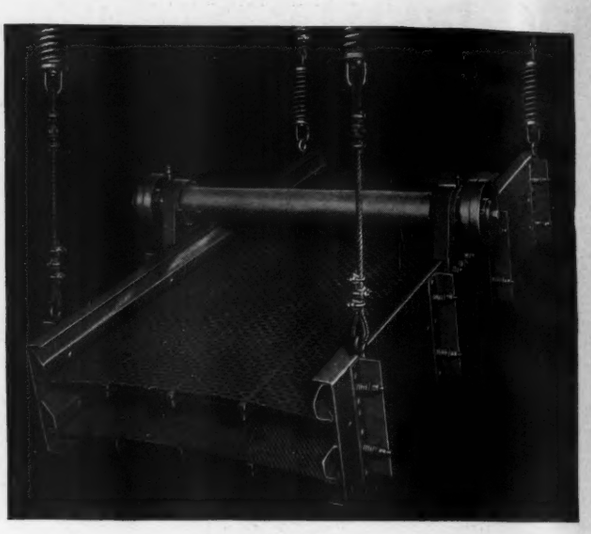
the 50th year

Two Types *of* Screens
Which do you need in your plant?

ALLIS-CHALMERS vibrating screens are available in two types . . . in sizes suitable for every plant. They are used for sizing crushed stone, slag, ore, sand and gravel, coal and coke, wood chips, commercial fertilizer, in fact, nearly all kinds of materials sized for commercial purposes, either wet or dry.

Aero-Vibe Screens

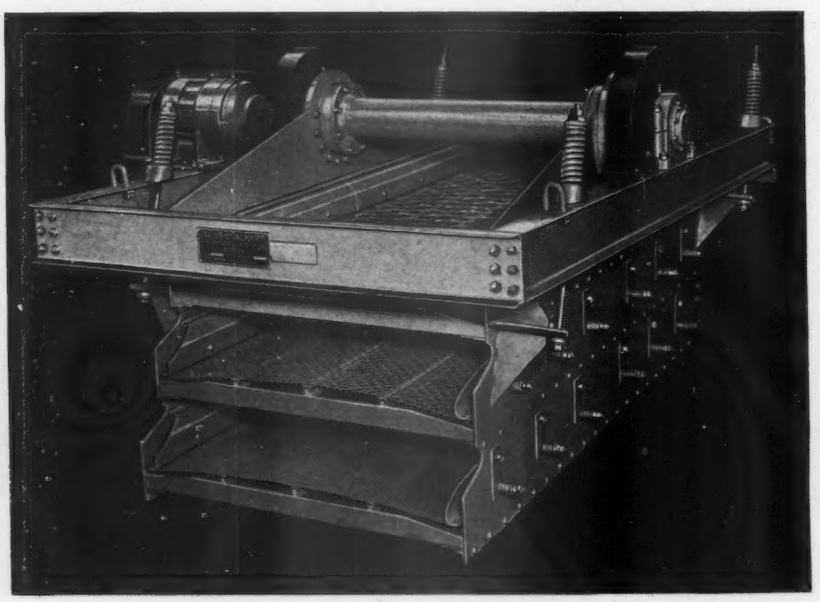
The "Aero-Vibe" screen "floats in the air" suspended from the supporting structure by cables and springs. A rapid, adjustable, vibrating motion is produced by counter-weighted wheels mounted on the drive shaft supported in anti-friction bearings above the screen body or vibrating member. Single and double deck "Aero-Vibe" screens are available from 1½ x 3 ft. to 4 x 10 ft. sizes for handling medium to fine size materials, and for limited tonnage.



Aero-Vibe Screens

Centrifugal Vibrating Screens

Style "B" Centrifugal screens are built with one, two, or three decks in sizes from 2 x 6 ft. to 5 x 14 ft. and are adaptable for heavy loads and the maximum range of material size. The screening action, which is equally intense for all tonnages, is transmitted to the Screen body or vibrating member by an eccentric shaft located above the screen and supported in anti-friction bearings. The screen body "floats" on balance springs reducing power and the load on the bearings; the entire screen is cable and spring suspended.



Style "B" Centrifugal Vibrating Screens

Crushing Plant Equipment

Gyratory Crushers
McCully and Newhouse
Non-Choking Concaves
Jaw and Roll Crushers
Revolving Screens
Vibrating Screens
Scrubbers and Washers
Elevators and Pan Conveyors
Feeders and Bin Gates
Friction and Electric Hoists
Grinding Machinery
Cement Mill Machinery
Mining Machinery
Electric Motors
Gearmotor Units
Texrope V-Belt Drives
Centrifugal Pumps
Air Compressors
Track-type Tractors
Road Machinery
Track-type Wagons
Tunnel Shovels

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

the all purpose dipper!

1.
Tooth bases are cast integral with lip (no expense for renewing bases).

2..
Note the dovetail joint! Lips are quickly and easily changed by loosening two U-bolts and removing four wedges.

3...
The U-bolt fastening between lip and back supplements and reinforces the dovetail joint between lip and front.

4....
Back lugs can be arranged to fit any type of dipper stick. Dippers are made either with bail or without as required.

5.....
A renewable Manganese Steel wearing band compensates for wear at the dipper heel.

6.....
Furnished with double wall lip and teeth for hard digging and rock handling; single wall cutter type lip and teeth for rehandling, stock piling and loose material digging; and a thin, serrated edge, cutter type lip for mucking, clay digging, etc.

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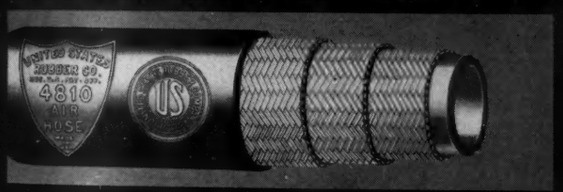

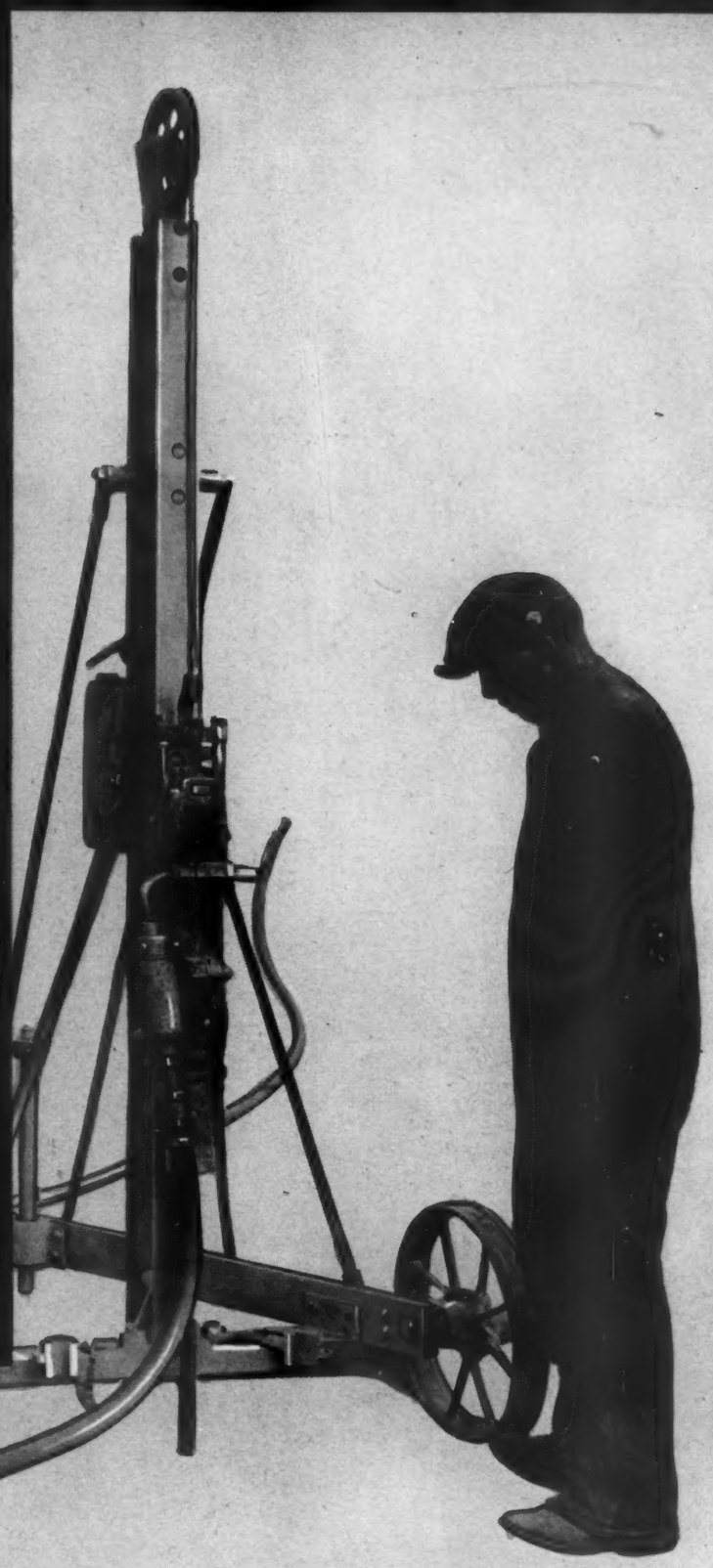

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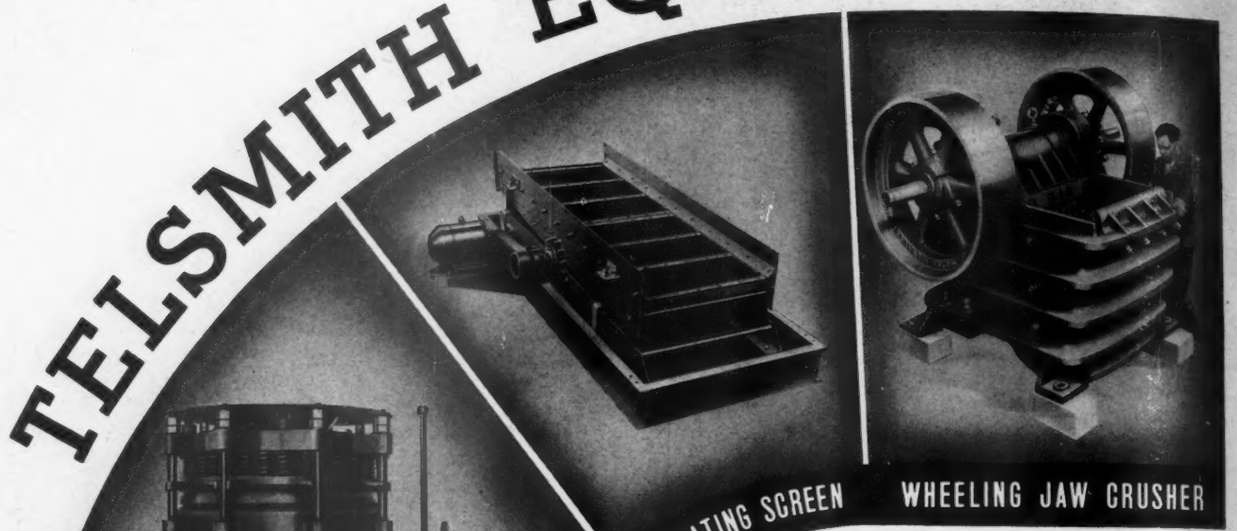

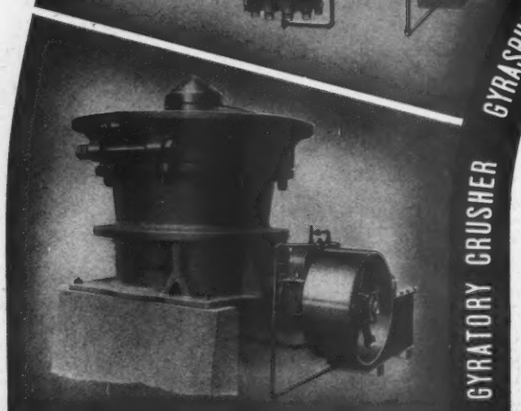

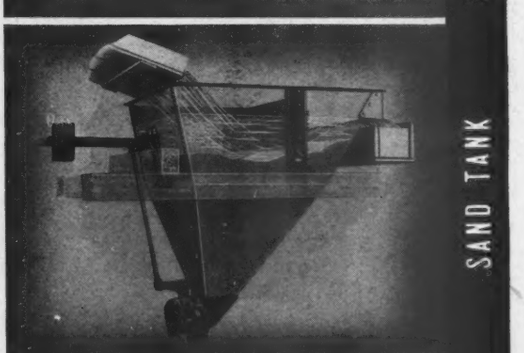

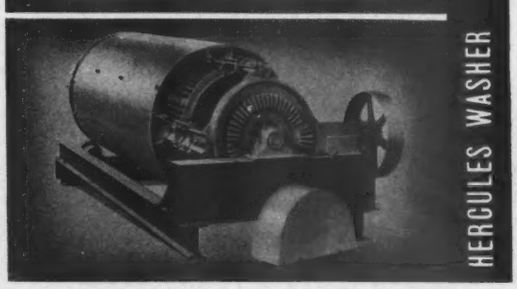

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Volume XXXVII | Chicago, November, 1934 | Number 11

Recovery Progress—Trends

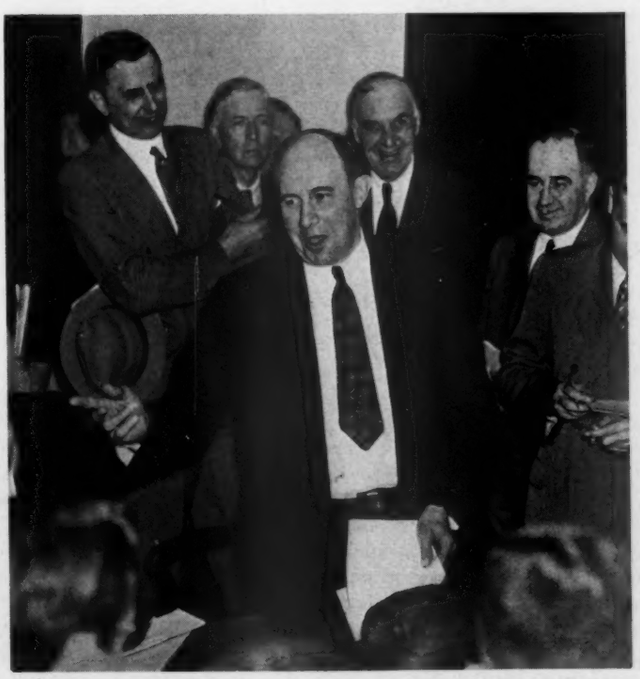
DEVELOPMENTS of the past month show the Washington administration and business on a considerably more friend'y and coöperative basis than for several months. The President himself is partly responsible, since he paved the way in his radio address of September 30, the following paragraph of which went straight to the point:

"Let me call your attention to the fact that the National Industrial Recovery Act gave business men the opportunity they had sought for years to improve business conditions through what has been called self-government in industry. If the codes which have been written have been too complicated, if they have gone too far in such matters as price fixing and limitation of production, let it be remembered that so far as possible, consistent with the immediate public interest of this past year and the vital necessity of improving labor conditions, the representatives of trade and industry were permitted to write their ideas into the codes. It is now time to review these actions as a whole to determine through deliberative means in the light of experience, from the standpoint of the good of the industries themselves, as well as the general public interest, whether the methods and policies adopted in the emergency have been best calculated to promote industrial recovery and a permanent improvement of business and labor conditions. There may be a serious question as to the wisdom of many of those devices to control production, or to prevent destructive price cutting which many business organizations have insisted were necessary, or whether their effect may have been to prevent that volume of production which would make possible lower prices and increased employment. Another question arises as to whether in fixing minimum wages on the basis of an hourly or weekly wage we have reached into the heart of the problem which is to provide such annual earnings for the lowest paid worker as will meet his minimum needs. We also question the wisdom of extending code requirements suited to the great industrial centers and to large employers, to the great number of small employers in the smaller communities."

Business Men Will Be Won Over to His Objectives

Since that statement the President has conferred with many leaders of business, thinkers and writers on business, to get constructive suggestions. He also said that the profit motive in business must be retained, and his subordinates in the Administration have reiterated the same thought. He has defended further large expenditures for public works and for relief, at the cost of an unbalanced budget, as a lesser evil than a larger army of unemployed, with revolutionary leanings. Apparently business men feel that they have a better understanding of his philosophy, and while there are likely still to be differences of opinions on ways and means and methods, all are getting back to a clearer view of fundamentals, which is encouraging.

Business men probably are inclined to flatter themselves that the increasing pressure they have recently exerted through such organizations as the Chamber of Commerce of the United States has been the important factor in producing the President's more receptive attitude. It is just as probable that he purposely waited until there was some crystallization of business sentiment to avoid wasting time interviewing many business men. That he will win over to his viewpoints many industrial leaders, regardless of their political affiliations, is a foregone conclusion of those who know the man.



Acme Photo

Donald Richberg meets newspaper men "ducking and dodging questions"

The Actual Chief of NRA

A recent characterization of the President by a staff writer for the *Wall Street Journal*, who had not previously known him, but had a month to observe him while serving as a member of the newspaper reporter's corps at Hyde Park last summer, is illuminating. Following are a few extracts:

"1. President Roosevelt is a hero to his valet. Never, even in jest or by innuendo, is anything said or done by those working under him which indicates anything but respect and admiration for him.

"2. He is a born Tory who likes progress. His vacation companions, like himself, are all of Society with a capital 'S.' His yachting host, Vincent Astor, has yet to make his first soapbox speech in favor of redistribution of wealth. George B. St. George and Judge Frederick Kernochan, two more of the little group who have come to be known as the

President's regular vacation cronies, are both members of the Tuxedo Club, from which the dinner jacket took its American name. The President is too honest to turn his back on such associations just because they might not help him politically with the forgotten man and men who think they are forgotten.

"3. President Roosevelt is a real executive. Only by rare ability to concentrate on the big things and delegate the rest is he able to give major problems the seemingly leisurely attention he does and still keep abreast of his work without sacrificing his health. When issues are not yet clear, as in the early days of a strike, he leaves others to delineate them, and perhaps to draw the lightning. When it is time for decisive action, he is ready, fresh and unhandicapped by antagonisms he might have aroused by too early participation in the fray. There are several lightning rods in what might be loosely described as his special cabinet.

"4. He is human. Newspapermen who have been visited by Mr. and Mrs. Roosevelt repeatedly during illnesses are hard to convince that behind it all is any political move. Unlike some of the Gotroxes who never spoke a kind word to a servant until the depression was three years old, the President has always been considerate of his staff.

"5. He is astonishingly persuasive. Big business is by no means united against him, if only for the reason that he has talked at length with some big business men. He is unbeatable when he is smiling, and he rarely lets himself get so tired as to lose his sense of humor.

"6. He is tenacious. All his life he probably has been rather successful about getting what he wanted, and the habit is not easily broken, especially when it is reinforced by a high moral objective.

"7. He is adroit. Those who believe that a President should move only in straight lines over previously announced courses, in keeping with the dignity of his weighty office, are bound to be disappointed in President Roosevelt. He is no political tank crashing through brick walls and breaking down trees, but, to use his football analogy, a man returning the ball from the kickoff, dodging, twisting, feinting, straight-arming, sometimes doubling back and even being thrown for a loss, but always trying for a touchdown.

"Such tactics are distressing unless you are on his side, and they call for some confidence in him personally even if you are. If his adherents here are right that America is on the way inevitably to a deeper social readjustment than Wall Street realizes, this very elusiveness may prevent formation of battle lines until the country has regained its composure sufficiently to obviate a serious fight.

"8. Politically he is building from the ground up. While he won the Democratic nomination, and thereby the Presidency, by capturing the Democratic party machinery in the various states in advance of the Chicago convention, and while he has in Postmaster General Farley a frankly efficient votegetter, by organization methods, his important appointments have not been narrowly political.

"The President relies greatly on friends. He doesn't need to appoint strangers for the votes they could bring him, and in some offices, at least, he knows so clearly what he wants that he doesn't need to appoint them for any superior intelligence and experience they might bring to the task. He does need men he can trust, men with no axes to grind. His search for them explains some of the puzzles in his present official family."

The foregoing is given at length because it appears to be the frank observation of an unprejudiced business writer with keen insight; without some such mental picture of the President it will be hard for business men to interpret forthcoming events.

New Chairman of NRA Board

Donald R. Richberg, chairman of the new NRA board, is well known to business men both personally and through his many speeches. His theme has generally been the philosophy behind the NRA and the New Deal, and he is a past master of logical, convincing explanation and argument. In many ways he is the opposite of the blustering, frank and outspoken General Johnson, who usually said what he thought regardless of results. Mr. Richberg, as his various addresses show, is tactful—an adept in adjusting his remarks to circumstances, so that except for the general theme of NRA philosophy, they are not always consistent. He evidently is primarily politically-minded, and a conciliator, very far removed from that rugged individualist, General Johnson, who fought to stamp out rugged individualism in industry. A seasoned Washington newspaper correspondent describes Mr. Richberg as "suave, careful in speech, dodging and ducking questions." He prefers to deal in such generalities as the philosophy of the New Deal, to meeting specific problems forthright. Yet this may prove a blessing; for probably more is to be gained by keeping attention on fundamentals than in chasing down bothersome departures from these fundamentals.

Mr. Richberg's Opinion of Codes

Mr. Richberg's real attitude toward the codes of the various industries, whose administration he will supervise, is perhaps expressed in an address he made to the Advertising Club of Baltimore, shortly before the announcement of his promotion—an address that has not been widely circulated. Mr. Richberg said in part:

"For a year we have been watching the leaders of American trade and industry pour into Washington accompanied by high-priced lawyers, economists and statisticians. We have seen them write their own codes of fair competition and set up their enforcing authorities for self-discipline, restrained all too little for their own good by Government supervision. And now we hear rising a strange discord of criticism. On the one hand the cry that big business is controlling the codes; and on the other the cry that the Government is strangling business with red tape and bureaucratic regulations.

"If this clamor were not so vicious, it would be ludicrous. Probably the longest, most detailed regulatory code that has been written is the steel code with literally hundreds of pages of basic code and supplementary regulations. It was written almost entirely by the industry. It is administered with a minimum of public control. Its administration requires the expenditure of $500,000 annually and a force of employes who, if established by the Government, would be called a bureaucracy.

"Personally, I do not believe that a host of such codes and such bureaucracies can be or should be made permanent. I believe profoundly in the wisdom of the process of codification; but I believe also that it must be simplified. But, if anyone desires to criticize the codes that have been written, and their administration, as being enmeshed in red tape and establishing bureaucracies, why, in the name of honesty, does he not criticize the business men who wrote the codes and set up bureaucracies for their administration? The National Government offered to industry an opportunity of self-government and if the experiment needs revision, the principal difficulty does not lie in persuading the Government to do the job, but in persuading the business men of the country to simplify these complicated mechanisms which they themselves devised."

Problem of Prices and Profits

The part of NRA codes most frequently attacked in the newspapers is "price-fixing"—a term used indiscriminately. Very few codes (the national resource industries) provide for actual fixing of minimum prices, except in so far as they prohibit sales below cost, or require uniform terms of sale, discounts, etc. Price reporting and publication under an "open price plan" is not *per se* "price-fixing," as many newspaper reporters apparently assume. Nevertheless, the so-called open price plan has been used and can be used as a vehicle to fix prices, and it is fear that it will be so used, or is being so used, that causes the frequent outbursts at Washington and elsewhere against "price-fixing."

Stability of price structures is the most important if not the only tangible benefit industry has received from NRA; and every announcement from Washington that this feature of the codes will be dropped is met with an avalanche of protest from industry; and results in rapid hedging on previous statements by NRA officials. Still, nearly all close observers believe "artificial" efforts to maintain prices by law will ultimately go, with the exception of the prohibition against selling below one's own cost for the express purpose of injuring a com-

petitor—a universally recognized unfair and unsocial practice.

Whatever the President's and the NRA's ultimate decision, the NRA at this moment continues to approve uniform terms of sale in the various districts under the Crushed Stone, Sand and Gravel, and Slag Industries' Code and continues to approve establishment of "permissive areas" where the entrance of new productive facilities without permission of the Code Authority is prohibited. Court actions by NRA to uphold price provisions in the lumber and coal industries' codes are not meeting with any unqualified success. Mr. Richberg has promised that there would be no sudden or sweeping changes in price and production control features of the various codes.

There is every reason to believe that under the new setup NRA will cautiously but continuously try to shift the burden of making the codes a success from its own shoulders to those of industry itself. This trend was clearly expressed in Chicago early in October in an address by F. A. Reilly, chief of the review division of NRA, who said: "The important factor is attitude. The NRA and codes can be made to work if industry wants them to work and not otherwise. There is no such thing as government planning as a substitute for industry planning; government thinking as a substitute for industry thinking, or government enforcement of codes as a substitute for voluntary industry observance. If the codes themselves which the administration has and will hereafter approve are not such as to command general industry confidence and support, and if resort must be had to the general use of compulsions enforced at law, the code undertakings will fail. In this event there would be left only choice between supplanting of the competitive system or unrestrained competition."

Stricter Code Enforcement

The common claim that codes are not enforced is not altogether accurate; the experience of the Code Authority of the Lime Industry described elsewhere in this issue proves the contrary in at least one instance; there are many other industries operating satisfactorily under their codes, and these cases receive little publicity. The President is reported to be sympathetic to greater effort toward code enforcement through closer coöperation of NRA, the Federal Trade Commission and the Department of Justice. The Litigation Division of NRA, which ordinarily considers cases only to determine whether some court action should be taken, has already more than 500 cases on its docket. Only a part of these have resulted in the institution of court proceedings. Compliance has been obtained in most of the remaining cases. The Compliance Division of NRA has found that its remedy of removal of the Blue Eagle is effective in most of the cases of violation. It is estimated that out of 100 complaints to NRA, actual prosecutions need be instituted in only five or six cases. Under the procedure for handling code violations which will continue to be followed, complaints of violation are first considered by NRA after the Code Authorities have done all they can. Its Compliance Division may withdraw the right to use the Blue Eagle. Should this be considered insufficient, the case is referred to the Department of Justice for the institution of injunction or criminal proceedings, or to the Federal Trade Commission for the entry of a cease and desist order. The Department of Justice determines whether suit should be instituted. NRA's recommendation may or may not be followed. If suit is instituted, the Litigation Division of NRA coöperates in its prosecution. A cease and desist order will be entered by the Federal Trade Commission only after formal consideration by it of, and hearing on, NRA's petition for the order. The new coöperative arrangement between the interested agencies, it is said, will result in a quickening and increase in code enforcement, and most probably in the institution of a greater number of proceedings before the Federal Trade Commission and the Federal courts.

Labor Dictatorial

While business leadership shows a definite trend toward closer coöperation with NRA, union labor, as represented by the American Federation of Labor, exhibits the opposite trend. At its recent convention in San Francisco A. F. L. voted unanimously for a 5-day, 30-hour week throughout industry. President William Green said: "It is the only constructive remedy to relieve unemployment. Nothing shall stop us short of realization of our purpose. We will not beseech the government alone, we must meet with both private industry and the government and we issue a challenge to both of them."

And Inconsistent!

Almost simultaneously with the foregoing "challenge," the A. F. L. issued a statement which read: "Our fundamental difficulty at present is that American industry is not producing enough to maintain our people at a decent standard of living. * * * Our immediate need is to increase production and buying power; to cut through red tape and lift industry quickly to higher levels. We must find a practical, workable plan, and this can only be done through coöperative action under government leadership."

Vertical Unions

At the San Francisco convention the A. F. L. also voted to depart from its long cherished organization of craft unions and to embark on a new course of labor control based on vertical or "industry" unions. Locals of these national unions will embrace all employes of an industry irrespective of their trade or craft. The strength and numbers of A. F. L. has hitherto been in unions of skilled labor such as steam-shovel runners and crane men, machinists, etc. It has never been successful in organizing unskilled common labor. Under the new scheme shovel and crane men employed in the cement industry, for example, will be in the same cement plant workers' union with the humblest unskilled workers. It seems to be generally assumed that the new type of organization will be helpful to closer relations between employers and labor, especially in isolated plant localities such as we have in the rock products industry, because here the locals, in many instances, will be practically single company unions. With vertical unions the problem will arise as to what the A. F. L. affiliation can do for members of a company union that they can not do for themselves, and whether it can do enough for them to justify the extra dues that will be demanded for its support. There may be set up under the vertical scheme of organization a healthful competition between the A. F. L. and the employer for the good will and loyalty of the employes.

Considering Big Housing Program

The President has reiterated that he favors the elimination of relief doles through absorption of the unemployed in some kind of useful work, and is said now to lean strongly toward a greatly expanded housing program as a means of providing employment. PWA Administrator Ickes has estimated he could use from 1½ to 2 billion dollars a year in this way. Many references have been made to the success of the housing program in Great Britain in solving the unemployment problem. A sour note, however, has been sounded in New York City. The *Chicago Tribune* (arch enemy of the New Deal) gleefully relates the following incident: "When 'Knickerbocker Village' was completed recently, with the help of an 8 million dollar loan from the RFC, these same officials united in a mighty paean of praise. In behalf of the poor, they gave thanks to a beneficent government. But the tenants now are unappreciative concerning the benefits they have received from being housed in the imposing structure. They announced they would pay no rent until they receive more benefits. The former inmates of the tenement houses in the area complain that the self-service elevators are inefficient. Frequently, they are forced to walk upstairs, they assert. Bathrooms are lacking in certain little luxuries that they were promised. Refrigerators are too small. The interior decorations offend the delicate sensibilities of many. So 750 of them met in a mass meeting at which orators harangued them for submitting to these inconveniences. The decision, reached enthusiastically, was that they were being downtrodden and would pay no more rent until the improvements they demand have been installed. Rentals, the tenants complained, were too high. The rentals average $12.50 a room. Communist workers at this meeting declared that the government, while seemingly benevolent, was in reality gouging the poor."

Combustion Economy in the Rotary Kiln*

Part 3—Various Kinds and Values of Heat Produced

By Robert S. Schultz, Jr.,
Consulting Engineer, Maplewood, N. J.

DR. GEOFFREY MARTIN, in his work on the cement kiln, already referred to, has done the cement industry great service by calling attention to the fact that there are two kinds of heat in the cement kiln and that these heats have very different values, both chemical and financial. Dr. Martin divides the total heat from the combustion in the kiln at the temperature of decomposition of the carbonates in the mix. Under certain assumed conditions, he determines this temperature as 1481 deg. F. Only that heat available *above* the temperature of decomposition can be utilized directly in the formation of cement clinker. This heat is of great value to the cement manufacturer. Heat available *below* the temperature of decomposition is, so to speak, waste product so far as clinker formation is concerned and is of use only in heating the mix.

Really Three Kinds of Heat

It is the present writer's contention that there are really three grades of heat in the cement kiln and that each of these heats has a very distinct, but very different, value in cement manufacture. These three grades of heat are:

(1) Heat available above the clinkering temperature and directly useful in the formation of clinker.

(2) Heat available between the clinkering temperature and the decomposition temperature, which is directly useful in the calcining process.

(3) Heat available below the temperature of decomposition, which is directly useful in the heating stage and in preparing the mix for decomposition of the carbonates.

Of these three grades of heat, the first is much the most important and valuable, since, without such heat, clinker would not be formed and there would be no portland cement industry.

A study of the heat balance in a cement kiln will show that under any probable combustion system and with any probable absorption of heat in the burning zone in the clinkering process, there will always be a large excess of heat available for satisfying the full requirements of the heating and calcining stages.

The aim of combustion in the cement kiln should be the production of a maximum amount of heat above the clinkering temperature, under any particular group of burning conditions.

Therefore, the real test of combustion efficiency in a cement kiln is the percentage of the total heat of the fuel which is made available in the burning zone and at temperatures sufficiently above the clinkering temperature to permit its rapid absorption into the clinkering process.

Note: The end of the clinkering process is exothermal, but the amount of heat given off is so small that the general character of the reaction may be considered as endothermal.

The clinkering temperature is usually considered to be between 2500 deg. F. and 2600 deg. F., depending on several conditions, particularly the composition of the mix.

In cement kiln practice, the combustion system should be designed to provide sufficient air for complete combustion of the particular fuel in the burning zone and combustion should be as perfect as may be practical by limiting excess air to that minimum which will show no combustible in the exit gases.

The problem of the method and rate of contacting the combustible and oxygen is essentially a problem in the type of combustion desired. Rapid contacting, promoted by mechanical agitation, produces a short flame of high heat intensity. Slow contacting, usually promoted by natural diffusion, produces a long flame of much lower heat intensity. Any desired variation between these two extremes can be secured by varying the method and rate of contacting.

The usual present method of rotary cement kiln combustion is to blow the fuel, incompletely mixed with a small portion of the air necessary for combustion, into the approximate center of the kiln opening at very high velocity and to allow the draft of the kiln to draw the balance of the necessary air, and frequently a considerable percentage of excess air, up the clinker chute and around the nose into the kiln and the burning zone. In this method, the velocity of the primary air-fuel mixture is so great that the rate of combustion per foot of kiln length is comparatively low and, since draft and natural diffusion are depended on to complete the process of combustion, the rate of contacting is slow. In kilns using this method of burning, and this includes a majority of the kilns in the industry, a long burning zone with temperatures only slightly above the clinkering temperature must result.

This method of combustion in the rotary cement kiln is an inherited method which does not conform to present knowledge of efficient combustion methods. Clinker of improved quality can be, and is being, produced at increased rates and with decreased fuel consumption through the use of methods designed to apply present combustion knowledge to cement kiln practice.

Heat Absorption

The production of cement clinker in the rotary kiln is a problem in heat absorption as well as in heat production. Heat may be absorbed in three ways, by conduction, by convection and by radiation.

Conduction is the transfer of heat from one part of a body to another part of the same body, or from one body to another in physical contact with it, without appreciable displacement of the particles of the body.

Heat transfer by conduction is directly proportional to the temperature difference and to the time during which heat is flowing.

Convection is the transfer of heat from one place to another within a fluid (liquid or gas) by the mixing of one portion of the fluid with another.

Heat transfer by convection is directly proportional to the temperature difference and to the time during which heat is flowing.

Radiation is the transfer of heat in the form of radiant energy from one body to another. A hot body gives off radiant energy which, on striking another body, may be partially reflected, partially transmitted and partially absorbed.

Heat transfer by radiation is directly proportional to the difference in the *fourth powers* of the absolute temperatures and to the time during which heat is radiated.

Due to the laws of heat transfer and to the short time, even under the most favorable conditions, of the passage of the flame and gases through the burning zone, the major part of the heat transference in the burning zone of a cement kiln must be by radiation. It also follows from the laws of heat transfer, that the higher the initial heat, or the flame temperature, the greater will be the amount of heat transferred by each of the three methods.

High flame temperatures result in high rates of heat transfer. The higher the flame temperature, the higher will be the potential rate of heat transfer and the greater will be the amount of heat available for absorption.

The major problem in combustion and heat transfer and heat absorption in the rotary cement kiln is the production of the *maximum practical* flame temperature, for the particular fuel and under the conditions of operation necessary for the particular kiln.

*Part 1 was published in Rock Products for July, 1934, pages 38 and 39; Part 2, September, 1934, pages 36 and 37.

Flame Temperature

A study of flame temperatures requires a basis for study. The accurate measurement of actual flame temperatures is extremely difficult due to indeterminate and constantly varying conditions of combustion and operation. The calculation of actual flame temperatures is equally difficult for the same reasons. It has become customary, therefore, in studies of this important phase of combustion to use the "theoretical flame temperature" as the standard or the basis for estimates and calculations. The "theoretical flame temperature" is that temperature which would be reached if combustion took place instantaneously and perfectly without loss of any of the heat produced to the surrounding vessel. "Theoretical flame temperature" is, of course, always higher and quite different from actual flame temperature, due to the unavoidable loss of heat, but these calculated values form a starting point of great value in studies of this subject.

The "theoretical flame temperature" is always higher than the actual flame temperature obtained under operating conditions. This is due to the following factors:

(1) At flame temperatures above 3000 deg. F., water vapor and carbon dioxide are partially dissociated with endothermal reaction.

(2) A large percentage of the heat of combustion may be radiated directly from the flame at instantaneous speed.

(3) Even under the most favorable combustion conditions, the total heat of combustion is not generated instantaneously. During the necessary period of combustion a considerable amount of heat is lost by conduction and by convection.

(4) At high temperatures, particularly above 3800 deg. F., the specific heats of the gases of combustion are not known with absolute accuracy.

The dissociation of carbon dioxide and of water vapor at high temperatures has been carefully investigated and it is possible to calculate corrections in "theoretical flame temperatures" resulting from this factor.

"Theoretical flame temperature" is based on the assumption of instantaneous and perfect combustion. Under practical combustion conditions such combustion is not possible due to the unavoidable time element. As the time required for combustion approaches instantaneity, the actual flame temperature approaches the theoretical. Due to the gaseous character of the fuel, the combustion of natural gas can be made more nearly instantaneous than that of either of the other fuels considered in this article and, under favorable conditions, actual flame temperatures close to the theoretical can be produced by gas flames. For natural gases, therefore, it is desirable to correct "theoretical flame temperatures" for dissociation.

In the practical combustion of bituminous coals and fuel oils the correction of "theoretical flame temperatures" for dissociation of carbon dioxide and water vapor alone is of little value, except under known conditions of combustion. Both of these classes of fuels contain appreciable percentages of higher members of the paraffine hydrocarbon series and, at the high temperatures of combustion, additional dissociation reactions occur. The amount and effect of these additional reactions varies with combustion conditions. Also, the time required for the combustion of these fuels introduces an additional variable factor which must be given full value and consideration. This factor has been called the "combustion intensity" or the rate of combustion. Its value varies with the type of combustion in use and with the combustion conditions. Under usual rotary cement kiln conditions, its values are low. These several variable factors prevent, except under known combustion conditions, the accurate computation of dissociation corrections for these fuels. Hence, uncorrected "theoretical flame temperatures" are a more accurate basis of comparison in a study of the combustion of bituminous coals and fuel oils than corrected temperatures.

In all calculations on flame temperatures, it is necessary to use the "net heat value" of the particular fuel under consideration. The "net heat value" of any fuel is the gross or total heat value decreased by the amount of heat required for vaporization of the water vapor formed by the combustion of the hydrogen in the fuel. This is a point which is lost sight of, frequently, in routine combustion calculations as well as in flame temperature calculations. In calculations on combustion in the rotary cement kiln, the gross heat value should be used in figuring total heat input but the "net heat value" should be used in all calculations involving the amount of heat available for the various chemical and physical processes. Even with the longest kiln, the temperature of the exit gases is well above 212 deg. F.

"Theoretical flame temperature," uncorrected for dissociation, equals the net heat value of the fuel, plus the sensible heat in the fuel, plus the sensible heat in the air used for combustion (total air, including excess air), divided by the quantity of the combustion products (including any excess air), multiplied by the mean specific heat of those products. Expressed as a formula, this becomes:

$$T = \frac{C + F + A}{P \times H}$$

where:

T = theoretical flame temperature (uncorrected for dissociation).

C = net heat value of the fuel actually burned.

F = sensible heat in the fuel.

A = sensible heat in the air used for combustion.

P = total quantity of the products of combustion, including any excess air.

H = mean specific heat of the products of combustion.

While this formula applies directly to "theoretical flame temperatures," it also shows the effect of these essential factors on actual flame temperatures. These factors are:

(1) The rate of the combustion reaction (combustion intensity).

(2) The degree of preheat of the fuel.

(3) The degree of preheat of the air for combustion.

(4) Excess air.

When these several factors are at their most effective values, the resulting flame temperature will be at the maximum, under the prevailing combustion conditions, for the particular fuel under consideration.

(*To be continued.*)

Growing Opposition to Diversion of Highway Funds

POLITICIANS are beginning to recognize the growing unpopularity of depriving men of work and automobile users of highway improvements by diverting gas tax and other motor vehicle funds.

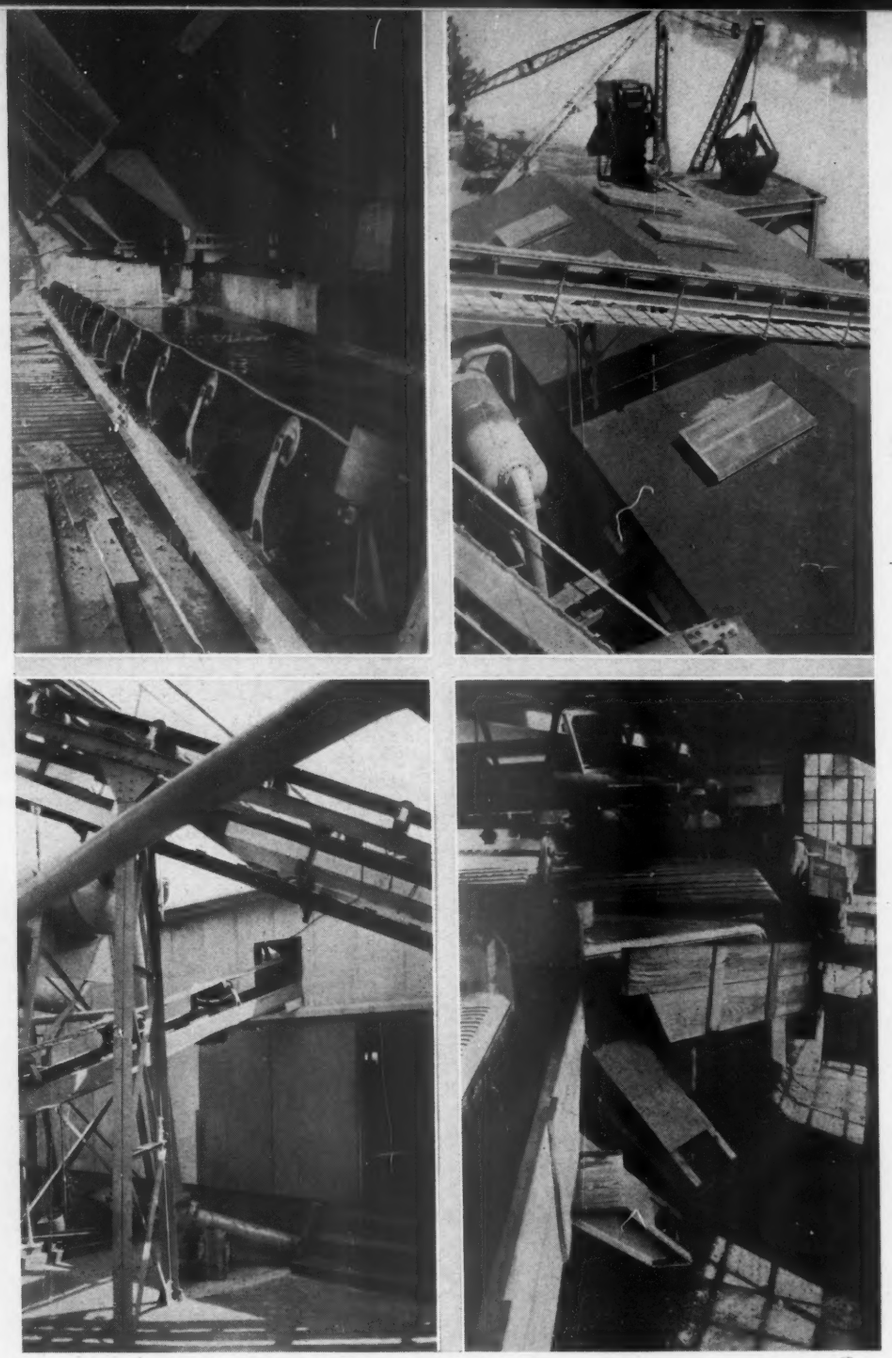
The *Chicago* (Ill.) *Tribune* of September 24 stated: "Candidates for office and others campaigning the state are capitalizing on this resentment of the motorists toward gasoline taxes and license fees while denied the traffic facilities they have sought, such as elevated highways for Chicago. They are urging a reduction in these special taxes. The Horner administration is preparing for a fight to protect its road revenues before the general assembly meeting in January. The task of the administration is to convince the motorists and their representatives in the legislature that with the revenues undisturbed the state will compensate car drivers for their taxes with the construction of facilities enhancing the pleasure and utility of automobile operation."

The *Milwaukee* (Wis.) *Sentinel* of September 15 reports from its Manitowoc correspondent: "Transfer of gas tax funds to the general treasury and the Schmedeman 'counterfeit economy program,' is responsible for the closing of the portland cement plant here, Assemblyman E. Myrwyn Rowlands asserted in a campaign address. The assemblyman, progressive candidate for state treasurer, cited the fact that some 300 men will lose their jobs as a result of the shutdown and asserted that, while the national administration is attempting to create jobs the state democratic administration supports a policy that brings loss of jobs.

"The Schmedeman administration," he said, "stubbornly refusing to raise income taxes, slashed allotments to counties for highway work and transferred $1,000,000 from the highway to the general fund in an effort to spare the burden of the wealthy taxpayers. The state's highway program was thus seriously crippled and the closing of the cement plant is directly attributed to the state's policy," he declared.

Problem of Solved by

• By Frances Sinclair



Upper left: Material being fed to 36-in. conveyor belt from finished storage hoppers at plant of T. L. Herbert and Sons, Nashville, Tenn. It is carried to receiving boot of elevator, where it is elevated to hopper over incline track for loading into cars. Upper right: Looking down on concentrator table plant. Note head of bucket elevator. Lower left: Raw materials being carried to washing plant from screening-plant storage. Lower right: Finished materials leaving tables and being discharged into storage hoppers under tables

THE August, 1933, number of ROCK PRODUCTS contained an article describing the use of concentrating tables by the firm of T. L. Herbert and Sons, Nashville, Tenn., in the washing of sand, this firm being the first producer in this country to apply the gravity principle, as exemplified by concentrating tables, to the production of commercial sand. The result of the use of these tables in the sand-washing plant was to raise the standard strength ratio of this tabled sand 25% above the State Highway Department specifications and to produce a sand that would uniformly show a colorimetric test of No. 2 plate where the unprocessed sand often gave No. 5 plate.

The latest addition to this modern plant is the gravel-washing section in which five tables are used. This plant is separate and distinct from the sand-washing plant and has been in operation since May of this year. These tables are of the same type and make as the original two, the Deister-Overstrom diagonal-deck concentrating tables, of specially rugged construction, built to withstand extremely hard duty. A special feature of the seven tables is the division of the deck into two operating halves. This type of table has been named by the manufacturer "the Herbert table."

For producers who are interested in the use of these tables, it may be desirable to follow through briefly the entire handling of the product.

Dredging

Dredging is done by means of a Diesel-electric clamshell dredge. The first separation is made on the dredge where the material is dug by clamshell buckets and placed into a receiving hopper beneath which are stationary screens consisting of a scalping bar screen, a bar gravel screen and a sand screen of spring steel wire specially built for T. L. Herbert and Sons. The over-size material is scalped and returned to the river. The gravel from 2-in. down to ¼-in. is fed from the screen discharge to a 36-in. belt conveyor which is used as a feeder conveyor, feeding the material to a 24-in. belt conveyor to a pivot-head receiving chute which places the material on gravel barges at the side of the dredge.

The sand, after leaving the sand screen, is flumed into a stationary sand-settling tank for the purpose of settling the sand and overflowing waste material into the river, and for the purpose of controlling the flow of the sand into a sump where an 8-in. suction pump lifts it to a flume. No effort is made to clean the sand on the dredge boat. The sand and water is pumped into the head end of a flume and passed through the flume, which has a series of perforated plate screens in the bottom to classify and size the sand. These perforated plates are set to produce fine sand, medium sand, and coarse sand. The classified sands are flumed to designated compartments in the sand barge.

Towing

The barges of sand and gravel are towed to the washing plant and unloaded by means of a clamshell bucket operated by a stiff-leg derrick into a receiving hopper. From the receiving hopper, the material is conveyed by means of a 24-in. belt conveyor to a two-way discharge hopper, one side being used for feeding sand to a 24-in. belt conveyor which delivers the sand to a pivot-head discharge chute, from whence it is discharged into a storage bin at the sand plant. The other side is used for discharging gravel to a double-deck Roberts-Scheafer gravel screen.

Screening

By means of the double-deck Roberts-Scheafer screen, three separate sizes are

Clean Sand and Gravel Concentrating Tables

Success with Sand-Table Installation in Tennessee Plant Has Led to New Adaptation of Table Units for Gravel Including 2 by 1¼-Inch Size

made—from 2-in. to 1¼-in., 1¼-in. to ¾-in., and ¾-in. to ¼-in. Each size is discharged into a separate storage bin. By adjustable discharge gates in each of these bins, the material goes to a 16-in. belt conveyor which carries the gravel to a receiving hopper above the concentrating table. These hoppers are of special design with adjustable feeding gates which can be operated by gravity feed or water-control feed.

Gravel Washing Process

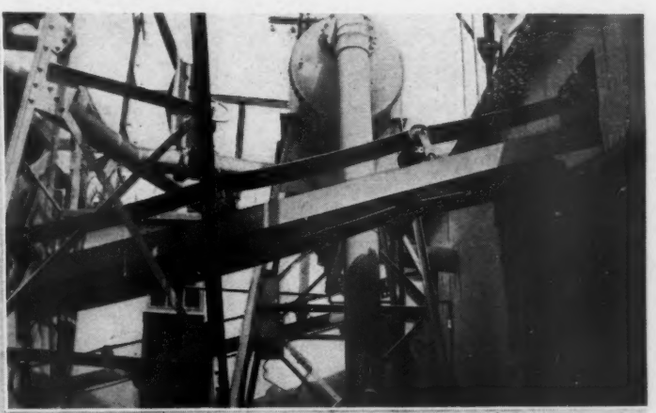
These tables are the outgrowth of coal concentrating tables and make their separations based on a difference in the specific gravity between the recovered product and the waste material, water forming the flotative agency for stratifying the different materials and carrying the lighter particles into the refuse. The method of operation is as follows: The feed mixed with water is introduced at the corner of the deck formed by the intersection of the feed and head motion sides. Dressing water is applied along the length of the feed side and flows over the deck surface. The feed, acted upon by gravity, dressing water and the differential reciprocating motion imparted by the head motion, stratifies and traves's upon the surface of the deck in such a manner that the low gravity portion is washed off the tailing side and the high gravity portion, guided by the riffles, is carried to the concentrate side and discharged into suitable launders beneath the tables. From the launder the cleaned product passes into the dewatering drag which discharges to the conveyor by which the cleaned and dewatered gravel is carried to the hopper at the top of the incline. The water and refuse are discharged by flume into the river.

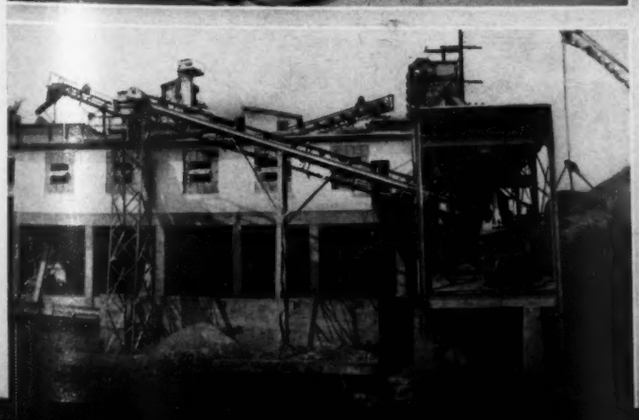
Sturdiness and Efficiency of the Tables

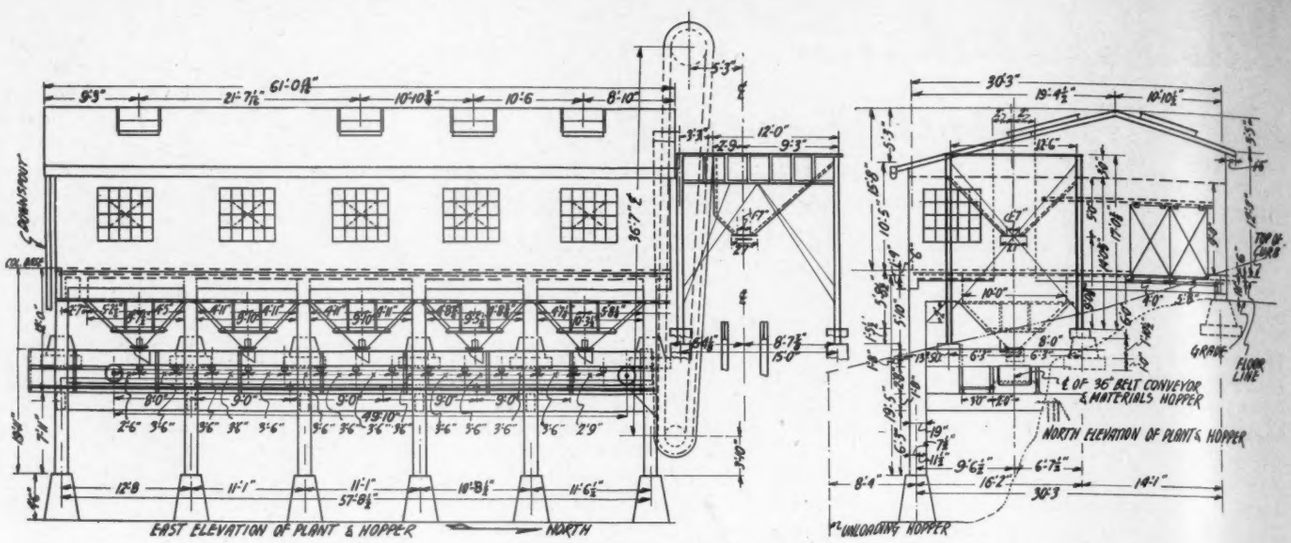
The decks of the tables of both plants are 7 ft. 10 in. by about 17 ft. and are covered with a high grade of rubber. Under each feed box, where the abrasion is greatest, a durable "Linatex" pad 30 in. by 15 in. is used. This Linatex material is made from the fresh rubber and is the most durable substance known for wear of this nature. On the top of the rubber cover, narrow riffles of moulded rubber are nailed. The spacing of the riffles depends upon the size of the material to be treated. The tilting frame and main base are structural steel of adequate sections rigidly braced. The head motion is of rugged construction, fully enclosed and running in oil. The deck is built of first quality, selected and seasoned cypress lumber. The unusual fabrication makes it self-bracing. The unique design of the diagonal deck gives a great deal more actual working area than is to be had through the

Gravel crushing plant of T. L. Herbert and Sons, Nashville, Tenn.

Lower left: River side of gravel washing plant of T. L. Herbert and Sons. Lower right: Side view of dredge showing belt conveyors for handling raw materials from dredge to barges. Upper left: General view of dredge, barges, unloading derrick, receiving hopper, yard storage and sand and gravel washing plants. Upper right: Water tank and 16-in. belt conveyors leading from screening plant to concentrator table plant







Side and end elevations of gravel-table-grading plant in Nashville, Tenn., showing the five table units and arrangements of hopper and conveyors.

use of the old style rectangular deck. Greater capacity and efficiency are the results.

Success in Handling Coarse Materials

For many years the concentrating table was considered applicable only to problems of cleaning and separation of fine materials. However, several years ago, as the result of much experimentation, the Deister Concentrator Co., Fort Wayne, Ind., successfully introduced the No. 7-C Deister-Overstrom diagonal-deck washing table which is adapted to the handling of coarse materials. This device has been extremely successful in the cleaning of coal up to 2 7/16 in., gravel up to 2 in. and iron ore up to ½ in. in size. Not only is a high degree of cleaning gained but the low power and maintenance possible have commended it to operators.

Referring to the specific problem of cleaning sand and gravel, it may be said that in general there are two types of problems, i. e., the removal of foreign material near the specific gravity of the sand and gravel, such as shale, soft stone, etc., and the removal of foreign materials whose specific gravities are considerably lower than that of sand and gravel; such as coal, coke, sticks, nuts, etc., this table has proved itself capable of handling both types of problems on sizes up to ¾ in. and the latter problem on sizes up to 2 in.

Table Settings

As stated above, the various sizes of gravel go to separate storage bins and are fed from these to the tables beneath by means of feeders and belt conveyors. One table is used on the largest size and two each on the intermediate and the smallest size. The table settings are as follows:

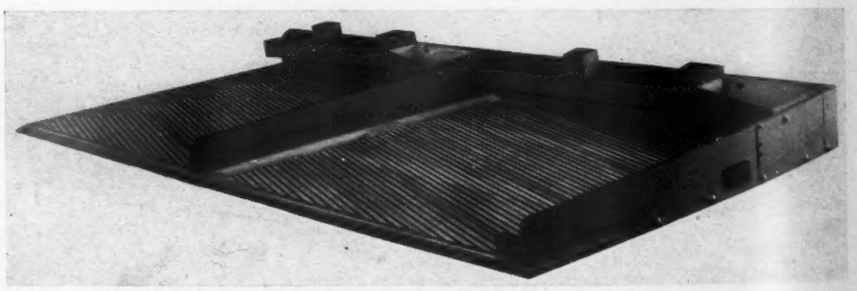
Table No.	Size gravel handled	Stroke	Speed	—End elevation— in ft.	Degrees	Side tilt
1	2 in. x 1¼ in.	¾ in.	294	27/64	2.5	5 deg.
2	1¼ in. x ¾ in.	⅞ in.	290	27/64	2.5	4 deg.
3	1¼ in. x ¾ in.	⅞ in.	285	27/64	2.5	4 deg.
4	¾ in. x ¼ in.	¾ in.	285	11/64	0.8	1.75 deg.
5	¾ in. x ¼ in.	¾ in.	285	11/64	0.8	1.75 deg.

Each of the five tables discharges cleaned gravel into separate storage hoppers placed in a line beneath the concentrate sides of the tables. Cleaned gravel may be drawn from each of these hoppers on to a common or mixing conveyor. This arrangement permits the drawing off of any individual size of cleaned gravel desired or a mixture of these sizes. Gravel goes from the mixing conveyor to loading hoppers or stock piles. The tables produce approximately 25 tons per hour of bright, clean gravel which will meet rigid specifications.

The seven tables have a combined capacity of 150 to 175 tons per hour of clean sand and gravel. The tables consume approximately 2 hp. each. The water requirement for the complete units is somewhat over 3,000 gal. per min.

The design and lay-out of the plants were made by A. W. Conrad, mechanical engineer of the firm, as well as changes, improvements and specially designed equipment for the plants as a whole. All equipment is driven by means of individual motors operating through V-belt or silent-chain drives. The plant is well lighted by many windows and by electric lights properly spaced. Its location on the river bank makes for easy handling of the product from the barges as shown in one of the accompanying views.

Not only have the advantages of producing a clean, uniform product been gained, but economies have been effected in the dredging operation as well. Prior to the installation of the table plant, it was necessary that areas for dredging be chosen with extreme care. Even the greatest of care did not always result in the type of product necessary to meet specifications. Since the installation of the table plant, dredging may be carried on at any point where sand and gravel are available regardless of the amount and kind of debris present. This has not only speeded the actual dredging operation, but has eliminated the long barge hauls formerly necessary. The plant not only *can* but *does* produce a clean sand which shows No. 2 colorimetric plate from material from the mouth of the Nashville sewer itself.



Deck of gravel washing table used in Nashville plant. It is split into two operating halves. Discharge from first section passes through slots in the deck lined with a rubber boot, carrying product below sub-frame

Over a period of seven years prior to the use of the tables, the cost of towing alone

was approximately 12c a ton. This cost is practically eliminated, or at least, cut in half, while the economy in power consumption is even more marked. When jigs were in use a 75-hp. slip-ring motor with actual 62-hp. pull was used. Each of the tables is equipped with a 3-hp. squirrel-cage motor but they actually perform their work with a fraction less than 1½-hp.

Sand and Gravel News Briefs

Hallett Construction Co., St. Peter, Minn., has reopened its plant to supply material for state highway contracts recently awarded. Fred Ross is superintendent. About 40 men have been reëmployed. Improvements are being made.

◈ ◈ ◈

Southern Sand and Gravel Co., Selma, Ala., suffered the loss of its towboat, the "Tombigbee," and two negro deck hands on October 11, when the boat collided with a bridge pier in the Tombigbee river. Three other members of the crew were rescued. The boat was valued at $25,000, partly covered by insurance.

◈ ◈ ◈

Jefferson, Ohio: Stella L. Tourney and Hubert J. Tourney have bought an action against Nicholas Carmello, to recover the sum of $1650 and costs. Plaintiffs say that they are owners of certain real estate at Geneva-on-the-Lake and charge the defendant with having removed from said premises a large amount of sand and gravel without their consent. They allege that the defendant having been engaged in removing sand and gravel from the premises immediately adjoining, took the same so close to the line as to cause the sand and gravel from plaintiffs' premises to slide into the excavation. Plaintiffs allege that they have been informed that the defendant has sold the sand and gravel so taken from them for $2.50 per load for gravel and $3.00 per load for sand.

◈ ◈ ◈

Pacific Coast Aggregates, Inc., San Francisco, Calif, will be reorganized in the near future along lines provided for in the new bankruptcy law, it is reported locally.

◈ ◈ ◈

Wheeling, W. Va.: Sand and gravel operations on Ohio river said to be on a larger scale than in several years. The Ohio River Sand and Gravel Co. has again put its dredge into service near Wheeling.

◈ ◈ ◈

Tennessee Valley Sand and Gravel Co., Sheffield, Ala., which has a contract to deliver cement in bulk by barge to the Wheeler dam, is converting several old sand and gravel barges into up-to-date bulk cement carriers.

◈ ◈ ◈

Keil Stone and Gravel Co., Hudson, N. Y., is having a public display of its products in the window of the Chamber of Commerce.

Top to bottom: Tow boat of T. L. Herbert and Sons; sand-table plant, drag conveyor and finish-sand conveyor leading to incline track hopper; gravel plant and pump barge with water line leading from river; tow being handled by boat above

American Aggregates Corp., Greenville, Ohio, has been awarded a U. S. War Department contract for dredging the Illinois river in the Chicago district, at a contract price of $134,334.

◈ ◈ ◈

Consumers Sand Co., Topeka, Kan.: A sale for benefit of creditors of the bankrupt company was attempted October 1 before E. H. Hatcher, referee in bankruptcy, but failed for lack of suitable bids. None of the bids made for the entire property were high enough to be considered, so he ordered them cast out. Bids on three separate pieces of property of the company, which he considered adequate, were accepted. Burton Hill, Topeka, bought land which the company owns at the foot of Jefferson St. for $1200. A sand plant at Wichita brought $4000, and another at Sterling sold to the city of Sterling for $4500. Action in regard to the property in general was deferred until a later date. In the meantime W. G. Dickey will continue to operate the company as trustee in bankruptcy. It was reported that during the past year he has been able not only to keep the properties intact and in good condition, but also to show a net profit of several thousands.

◈ ◈ ◈

General Construction Co., Portland, Ore, have completed a new $75,000 plant on the east side waterfront to supply material for the construction of the Bonnerville dam. The sand and gravel is dredged from the bed of the Willamette river between Portland and Oregon City.

◈ ◈ ◈

Geneseo, Ill.: A new firm has been organized by Bernard E. Sommers, former mayor; John Bollen, his partner in the firm of Sommers & Bollen, and Charles H. Atwood, proprietor of the Geneseo laundry. Papers have been signed for option on what is known as the Mandell land on the north side of Penny slough. The firm has also secured options on sections of the river and will take out gravel there if that on the land does not prove suitable. The site is adjacent to the point where a new bridge is being built across Rock river. It is likely that later on a sales force will be organized by the firm and the gravel sold to contractors, road builders and dealers, according to local newspapers.

Chalk

I Do Klean Products Co., Wilder, Idaho, is the name of a new enterprise for which a plant is under construction across the Snake river from Wilder. The product of the mine is a chalk substance of a smooth scouring quality, especially adapted to the removal of the alkali and wire-worms from the soil. The claims were discovered five years ago by J. L. and W. H. Jones and have been taken over by the company of which W. A. Austin, New York, is president. The company expects to manufacture fertilizer, tooth paste, tooth powder, scouring powder, mechanic's soap, valve grinding compound and kalsomine.

Mississippi Sand and Gravel Rates Reduced

THE Mississippi State Railroad Commission ordered a flat 25% reduction on intrastate freight rates on sand and gravel for highway construction, effective September 20. Application of the railways to the state courts for an injunction to prevent the rates going into effect was refused. The railways will appeal to the federal courts.

1. *Booth & Flinn quarry in Loyalhanna limestone, Long Bridge, Penn.*
2. *Gravel pit, west of Fairview, Penn.*
3. *Universal Gypsum & Lime Co. quarry and mine, York, Penn.*
4. *American Lime & Stone Co., Bellefonte, Penn.*
5. *Gravel pit, west of Fairview, Penn.; Nickel Plate Sand & Gravel Co.*
6. *Vauport limestone quarry, Lake Erie Limestone Co., Hillsville, Penn.*

Producing Aggregates Under NRA in Pennsylvania

Here Is One State With a Fair Amount of Business; One Conclusion Is That All Quarry Labor Must Be Experienced if Not Skilled Labor; Consequently NRA Has Not and Probably Will Not Result in Much New Employment

By a Special Correspondent

THE stone, sand, and gravel business in Pennsylvania is of considerable proportions, amounting to 30,000,000 tons valued at $32,000,000 in a single year. The quarries and pits are distributed from the Delaware River to the Ohio line, so interviewing many of the operators would mean much mileage and time. Perhaps the opinions of operators in a few counties in the eastern end of the state give a fair idea of how they feel about the NRA.

I interviewed several of them, including producers of crushed stone, lime, sand and gravel, ranging from employers of 10 to 250 men. My impression is that the reaction to NRA and the code for the industry depends somewhat on the operator's early experience. Men who started 40 or 50 years ago with little or nothing grew up with the idea that man should work 12 hours a day six days a week, and that work, sleep and eat is the sum total of the workingman's lot. A man who has been through that mill and won a place as an employer of labor, a man who went through the drudgery of such toil, made the grade, and has for years been the boss, deferring to the opinions of none, giving orders instead of taking them, has in some cases an inclination to grumble, to put it mildly, at the New Deal.

Such men object to the Government or any of its representatives telling them how they shall manage their businesses, how many hours the men may work, and the rate they must pay them. They feel that there is injustice in giving the inexperienced and incompetent laborer the same wage as the old, experienced, and competent hand. Much as it hurts their pride or gnaws at their spirit of independence, however, they are following the rules and playing the game.

But we have another brand of operators, men born since the turn of the century, men who were not old enough to have a job until after the World War. These men never worked for anyone 12 hours a day, never loaded stone by hand in a horse-drawn wagon or hauled it by team. They have always worked with power shovels and motor-driven trucks. To them 8 or 10 hours is a day's work and there must be leisure time for enjoying life. These younger men have always known of welfare drives for the community chest, of the citizens' responsibility to share with the unfortunate and dependent, and to them the New Deal is a case of sharing jobs, working fewer hours for less pay, perhaps, so that the other fellow has food for his kids, too. These younger operators look on the New Deal as the fairest way to keep the wheels turning and get the country out of its difficulty.

All Quarry Labor Skilled?

Some operators say frankly that so long as business is such that they can fill orders with their old and experienced men, they can work contentedly under the NRA, but if business should pick up so much that, in order to keep up with demand they had to take on new men, inexperienced in the work, there is a question in their minds if they could make any money. There likely would be a heavy turnover on the payroll, less tonnage per man, and inevitable breakage.

As one operator said: "If I need another truck driver and the man who applies is well recommended and talks big, I may take him on and find to my sorrow when he has broken an axle or stripped a gear, that his experience had been with a bakery delivery truck." On the other hand, some optimist will say that broken machinery means an order for the manufacturer, and so men in his plant, in the steel mill, the iron mine, have more work, more wages are distributed, more men are buying more food, clothes, automobiles, and paying their taxes; and that is what we must have, and what the NRA hopes is going to boost business.

No Standard as to Working Hours

As for individual instances: The gist of an interview regarding the operation of a company employing more than 100 men was that the New Deal assures equal distribution of jobs. Two shifts of 8 hours each five days a week are worked between 8 a. m. and 12:30 a. m., and the men seem content so long as their families have enough to eat, a good house to live in, and know that a job is theirs so long as and whenever the company operates its plant. These men and their fathers before them have known no other jobs and do not go elsewhere seeking work when the plant is closed for months at a stretch; but, being a thrifty breed, make gardens, pick berries in the mountains, and otherwise try to be independent. The company recognizes this and when the plant is idle for a long period parcels out a few hours a week of clean-up work.

A limestone quarryman whose product is used in highways and general construction, said business has been more or less continuous the past five years. The quarry is idle in winter but stock piles supply the demand in those months. He was comparatively busy in May, June and July, the latter month being best; but in the first half of August business was "flat." He employs about a dozen men, all old-timers. One man has been working at this quarry 55 years and another 26 years. There have been no accidents, not even minor ones, in the past two years.

With business as it was this summer the gang, working five 8-hour shifts, can take care of the orders, especially if an extra shovel operator is hired to build up a surplus stock. Most of his men are paid more than the minimum code wage. So long as the work is done by his old, experienced men there is no appreciable variation in output per ton per man. If any increase in demand required taking on more men and working two shifts per day, there would be a lot of hiring and firing until suitable men were found; for, as he said, "Green men don't make quarry men quickly." Then, of course, costs per ton would go up and output per man would drop.

Prices the Same; Costs Up

An employer of 13 men replied to my question, "Sure, I'll talk—and how! Do we like NRA? We do not. Here is how it affects me: I used to employ five men and they worked 10 hours a day, six days a week. What I told them to do was done, even if I was away two or three days in a week. I laid off one man in three years. Each man got what he was worth to me. Some men made $30 to $35 per week. Now what? I have 13 men working in two shifts, 6 to 12 and 12 to 5, 5:30 or 6, depending on the orders or cars ready to be loaded. The morning gang gets 36 hours a week and the afternoon gang may get only 30 hours. They kick because all do not make the same number of hours and all of them kick because they do not make 40 hours. Now the best of them cannot make over $16 a week and the poorest workman gets the same as the best. They average about $12 a week.

"More than half of the men are new and inexperienced and, of course, inefficient. That means my supervision is increased 100 per cent and I can't get away even for half a day. The old gang of five would get out 400 tons in a 10-hour day, but it keeps me driving them to make 13 men get out 300 tons in 11 hours. Then, too, you know it's

human nature to start slow. The first hour is not up to capacity by a long shot. The plant is on the job, but the men are not warmed up. Now under NRA I have to work two shifts a day and that means two of those danged slack hours instead of one. My output is 20% less than three years ago and the cost of producing that reduced tonnage is 60% greater.

"So you see in spite of lower wage rate, cost of production per ton has gone up tremendously in my case because of incompetency and carelessness of green men. I have hired and fired 15 men in the past year as compared with one man in the previous three years. My men are now proposing to work 10 hours on alternate days; then each gang gets the same time. They say they prefer 30 hours a week that way for it gives them three whole days free in which they can take other jobs. How that is, when so many men are out of work, and say they can find none, is beyond me; but my men say they can pick up at least one and maybe two whole days' extra work per week. So, we are going to try alternate 10-hour days. All other costs have gone up except electric power, but the price of our product has not risen. No, sir, we don't like NRA at all."

No Effect on Costs Now

Another producer of concrete aggregate said: "Business is intermittent. We may have plenty of orders for two weeks, and then will be practically idle for a week or more before more orders come in. Under these circumstances we can keep up with the demand by working our regular men 40 hours a week, 8 hours for 5 days. Our men used to work 12 hours at a lower rate, but we have raised the wage so that now when working only 8 hours they get almost as much money at the end of the week. These men have been with us 8 and 9 years. There are 10 of them. They grumble a bit, of course, for all good men want to work more than 40 hours a week, but they are philosophical about the situation, realizing that when we get more orders they will get more time. We feel it is better to pay good men overtime than to take on green men, because that means inefficiency and breakage. As it is, NRA has had no particular effect on our labor costs or output, but we would hate to try working under NRA if business were brisk."

A producer of road metal in another district employs 14 men and works two 8-hour shifts between 4 a. m. and 8 p. m., 5 days a week. When the call for crushed stone slackens they work 10 hours a day 4 days a week. If business is real active the men get overtime at 53 cents per hour, because the operator prefers to give his regular experienced men extra pay rather than break in new men. This producer has no objection to the NRA rules, but suggests that it might be more equitable if businesses which normally are idle in winter are permitted to employ their men 65 or 70 hours per week in summer. The men would be glad to work that long.

An operator producing concrete aggregate and flux stone employs 250 men at several quarries. They work 8 hours 5 days. Business was fair this summer but was down a bit in August. He intimates that cost of production has risen a little but output per man probably has not been affected, for it has not been necessary to employ new men.

Conclusions

From these conversations I gathered that the quarry operators are abiding strictly by NRA rules and feel that the plan probably is the best way out of our difficulties right now. Business, however, is not good yet, and so long as it is not brisk most of them can get along without hiring new men unacquainted with the jobs to be performed. So long as they are working only their regular men there is no marked change in cost of production per ton or in tons per man per day. It seems to be a common feeling that if and when demand for quarry products becomes active or approaching capacity of the plants and it is necessary to hire new men, then the cost per ton will go up and the output per man will go down. They frankly say that they do not know how it would work out if business took a spurt. They seem to feel it wou'd mean more supervision, more worry, more accidents, and less profits, if any.

Soluble Alkali Silicates Rather Than Silica Probably Cause Rapid Silicosis

Excerpts from a Paper by F. S. Fowweather, M. D., University of Leeds, England, Read at a Meeting of the Refractories Association of Great Britain*

FOR over two years Prof. Stewart and I have been collecting and examining the lungs of miners, asbestos workers, sand-blasters, and others who have worked in an industry believed to carry a risk of silicosis. Determinations have been made of the ash and the silica content of these lungs, as well as microscopic and naked-eye examination for evidence of silicotic fibrosis, and of associated diseases—tuberculosis, bronchiectasis, pneumonia, etc.

Normal Amount of Silica Present in Lungs

Normal controls have been examined, to obtain evidence as to the amount of ash and of silica present in lungs which have not been exposed to dangerous dusts. Of five adults who from this point of view were considered normal, and whose ages lay between 23 and 65, the lungs showed ash from 3.95% to 4.66% of the dry lung tissue, with an average of 4.42%. The silica content was from 0.12% to 0.20% with an average of 0.163%.

The results so far as the remaining cases are concerned (*i. e.,* cases of actual silicosis, or cases who may have been exposed to some risk of silicosis) have been arranged in two ways, namely, according to the amount of silica found in the lungs and according to the industry in which the patient had been engaged. I propose to consider mainly the arrangement according to amount of silica in the lung; I shall not consider all the cases, but only those that appear to be of special interest. The amount of fibrosis noted on microscopic examination has been indicated by Prof. Stewart in three grades, which I shall call 1, 2, and 3, in order of increasing severity.

Cases of Silicosis

The first case in the list shows 6.25% of silica in the lungs. It is the case of a coal miner who died at the age of 62 from chronic empyema with a terminal acute pericarditis. The lungs showed considerable patchy fibrosis; microscopically the fibrosis was of grade 2. This man was a miner for 20 years, and then a farmer for 30 years. He must, therefore, have accumulated his 6.25% of silica 30 years before he died. In sharp contrast with this case is that of a sand-blaster who died at the age of 27 of silicosis after working at this job for 13 years. He was only away from his work two months before he died. While the silica in his lungs amounted to 4.18%, *i. e.,* only two-thirds of that of the previous case, the fibrosis present was of grade 3. Another sand-blaster died at the age of 26, with 4.00% of silica in his lungs and a fibrosis of grade 3.

Next in the list comes a South Wales coal miner, aged 53, who had 3.95% of silica in one part of the lungs and 2.69% in another. He died of silico-tuberculosis, with a grade 2 fibrosis; he had been a miner for 32 years. The next case, whose occupation we have not yet ascertained, died at 69, with 3.92% of silica in the lungs. The degree of fibrosis in this case was only grade 1. An iron-ore miner, aged 42, who had followed this occupation for 24 years, had nearly 1% of silica less than the previous case, viz., 2.96%, but died of pulmonary fibrosis and tuberculosis, with a grade 3 fibrosis. The next case, a tin miner of 65, had a grade 3 fibrosis with 2.84% of silica in the upper part of the lungs while the lower part was practically normal, having only 0.33% of silica.

*Published in full in *Chemistry and Industry*, August 17, 1934.

Of considerable interest is the case of a stoker who died at the age of 55 of cancer of the stomach. He had 2.00% of silica in the lungs and though there was considerable anthracosis there was no evidence of silicosis and microscopic fibrosis is reported as below grade 1. In a miner of 66, with 1.83% of silica, the lungs had also a negligible amount of fibrosis; yet an asbestos worker of 40, whose lungs contained 1.54% of silica, died after 11 years' work in an asbestos factory of pulmonary asbestosis six years after he had left this work. His lungs showed a grade 3 fibrosis.

Next come two sharply contrasting cases of miners. The first, aged 55, had been a miner for 41 years. He had 1.40% silica in one part of the lungs and 1.12% in another, with a grade 3 fibrosis; the second, aged 53, had 1.15% of silica in the lungs with a negligible fibrosis. He died of cancer of the lung. Then we have another sand-blaster, also young. He died at the age of 24 after having been a sand-blaster for 7 years. He had 1.14% of silica in one part of the lungs with a grade 3 fibrosis and 0.28% in another. Yet another sand-blaster, aged 58, after 15 years in this industry, had 1.03% of silica, and a grade 2 fibrosis. Tuberculosis was also present.

Of special interest is a group of four cases all showing the same lung silica content, viz., 0.89%. The first, a woman of 26, had been engaged in the making of an abrasive soap for three years. She died of acute silicosis, with a grade 3 fibrosis. The second, a man of 44, had been a grinder for 28 years. He had a moderately advanced chronic silicosis, with a grade 2 fibrosis. The third, a man of 65, had been a cuphandler for three years and had been engaged "in rock and jet for 30 years before that." He died from malignant disease and his lungs showed only a grade 1 fibrosis. The last, a miner of 61, who also died of malignant disease, had negligible fibrosis. Notable among the next cases in this arrangement are a stone-mason of 52, who had worked all his life at this occupation and who had 0.76% of lung silica, and a woman of 31 who had worked for 11 years in an asbestos factory and had 0.53% of lung silica. In both a grade 3 fibrosis was present. Following these cases there is none with grade 3 fibrosis, but a stonemason aged 61 with 0.43% silica, another aged 52 with 0.33% silica, a sand-blaster of 42 with 0.33% silica, and an asbestos worker aged 45 with 0.28% silica, all showed a grade 2 fibrosis. Still lower in the list are an asbestos worker of 37 with 0.24% silica and a sand-blaster of 50 with the same amount and both show a grade 1 fibrosis.

Amount of Silica Present Not Criterion

The first definite conclusion which arises from a consideration of these results is that there is no obvious connection between the amount of silica in the lungs and the amount of fibrosis which is present. Thus a stonemason with 0.33% of silica in his lungs died at 52, and a worker in asbestos after only six years' exposure to the dust and then a 15 years' interval died at 45 with 0.28% of lung silica, while a miner, after accumulating 6.25% of silica, lived until the age of 62, and all three had approximately the same degree of pulmonary fibrosis. The amount of silica which accumulates in the lungs is therefore not the sole factor on which depends the resultant degree of fibrosis.

When we try to find the connection between the silica in the dust inhaled and the degree of fibrosis the conclusions are not so obvious. The time during which the patient has been exposed must be taken into account and whether exposure has been continuous during the working period, or intermittent. Thus we cannot say because two persons have accumulated the same amount of silica in the lungs that they had therefore been inhaling dust of equal silica content. Nevertheless, a careful examination of the list does seem to offer some evidence on this point. We have, for example, a stoker for 14 years who had accumulated 2.00% of silica, while a sand-blaster for 15 years had only accumulated 1.03%. Yet the former had a negligible fibrosis, while the latter had a very definite fibrosis of grade 2. Without knowing more precise details as to hours and conditions of work, we cannot say that because the stoker had accumulated twice the amount of silica that the sand-blaster had, that the dust he had inhaled had a silica content equal to twice that of the sand-blaster's dust. But, after making considerable allowances for different conditions, it does not seem to be overstretching the probabilities if we say that the stoker's dust had at least as much silica as that of the sand-blaster. If that is true, then it follows that the degree of silicosis does not depend solely on the silica content of the dust inhaled.

Again, a stonemason, aged 52, who had been a stonemason all his working life, *i. e.*, for 30 years or more, had accumulated only 0.76% of silica, while a sand-blaster for 14 years (aged 43) had accumulated 2.46%, *i. e.*, about three times as much in roughly half the time. Yet in the former there was a grade 3 fibrosis, and in the latter, grade 2.

Nature of Dust Important

Many similar contrasting pairs can be picked out, strengthening the view that the relationship between silica content of dust and degree of silicosis produced are not closely related. If then silicosis does not depend solely on the amount of silica in the dust or the amount of silica in the lungs, what are the real determining factors? It seems to me that there are only two possible answers; these are:

(1) That silicosis is determined not by the amount of the silica but by its nature; *i. e.*, silica in some forms is a much more potent agent for producing silicosis than in other forms.

(2) That silicosis is determined not solely by the amount of silica but by certain conditions present in the body of the person into whose lungs the silica gains access.

We have here, then, to consider, as in practically all diseases, the nature of the causative agent and of the organism on which it operates. It is similar in many respects to the old question of the comparative importance of seed and soil. There is certain evidence in favor of each factor being of considerable importance, and as in so many other conditions, it is very probable that in many cases both are in operation together. Silicosis is most likely to develop when silica in certain forms operates in persons who, for some reason or another, are more than usually susceptible to its action.

Let us consider first the question of the soil—the nature of the individual concerned.

In the first place, we cannot deny that there must be a considerable variation in the powers of resistance of different individuals all presumably healthy to the harmful action of silica. It is true of all other disease-producing agents and there is no reason to doubt that it is true of silica. Again we should expect that in the presence of some pre-existing weakness or disease of the lungs, the harmful effect of silica would be greater and more rapid than when the lungs are originally in a sound, healthy condition. No doubt it is generally true that the diseases found commonly to be associated with silicosis are secondary to, or their production and development are favored by, the damage produced by silicosis. But this may not be true of each individual case. It is probable that of the cases we have examined a few at any rate may have had some lung disease at the time the silica began its harmful operations. Moreover, there is the question of the occurrence of disease after silica has already gained access to the lung.

Possible Infection of Lungs a Cause

It is possible that what, in normal lungs, would be a minor and temporary affection, may be in lungs already containing silica, or the seat of an incipient silicosis, a stimulus to the development and acceleration of the silicotic process. The recent work of Kettle (E. H. Kettle, *Journ. Path. and Bact.*, 38, 201, 1934) in which the combined effect of dust and an infective agent has been studied, is of considerable importance. The infection itself need not be a virulent one; in fact, low-grade infections are believed to be of special importance in this connection. Without going into the details of his work I will quote from his conclusions:

"It is generally acknowledged that even a serious degree of pulmonary fibrosis may be caused by the inhalation of silica without any accessory factor, but this pure or simple silicosis is rarely of clinical significance; nearly always silicosis is associated with tuberculosis and my experience of silicosis in this country leads me to place increasing importance on the infective factor. I rarely see a case of simple silicosis and even in those

in which tuberculosis appeared to have been definitely grafted on to a silicotic lung, there has often seemed to me strong evidence that the apparently pneumoconiotic lesions were really infective from the beginning. These experiments support this view for they show that lesions can be rapidly produced in the lungs of guinea-pigs when a dust is combined with an infective process, whereas lesions can only be produced with the greatest difficulty, if at all, by the dust alone."

These conclusions imply that the presence of an infective process is of paramount importance in the production of silicosis; but in considering the experimental results it should be borne in mind that:

(a) The test animal was the guinea-pig and not man.

(b) The siliceous material was administered by intratracheal injection and not by inhalation.

Thus neither the subject nor the method is quite the same as in naturally occurring industrial silicosis.

Pure Silicosis Is Relatively Rare Disease

With regard to the relative frequency of pure or simple silicosis, and silicosis associated with tuberculosis or other infective processes, our own cases show about 50% with tuberculosis, while in about 10% not only was there no tuberculosis but no evidence of bronchiectasis, bronchitis, pneumonia, abscess, or gangrene. Of this 10%, death was due in certain cases to disease unrelated to the silicosis (*e. g.,* malignancy, outside the lungs). Hence, not all of these cases were affected clinically by their silicosis. Thus it is true that cases of pure silicosis, especially with clinical evidence of the condition, form only a very small portion of all cases of silicosis, but we hesitate to describe the condition as "rarely of clinical significance."

But when due allowance is made for all these considerations, it must be admitted that Kettle's work does indicate that the infective factor is an important one in the production of silicosis.

An examination of the classification of our cases that I have already referred to, shows that at the head of the table coal miners figure very prominently, whereas at the foot of the table we find sand-blasters, stonemasons, and asbestos workers. That is, in general, miners who have silicosis have relatively a large amount of silica in their lungs while sand-blasters, stonemasons, and asbestos workers have silicosis in the presence of much smaller amounts of silica. In general terms the dusts inhaled in some industries are more potent, as silicosis producers, than those of other industries; the nature of the inhaled silica has something to do with the onset and development of the disease. There is also the possibility, however, that accompanying non-siliceous dusts may exert a modifying effect on the action of the siliceous material inhaled. Some modifying effect of coal dust, for example, may account for the difference observed between the silicosis of coal miners and that of workers in industries in which coal dust is absent.

Asbestos Particularly Harmful

I propose now to consider some important facts to be drawn from the second classification of our cases, namely, according to occupation. Of special interest is the group of asbestos workers.

We have so far complete data of five cases; four others are awaiting analysis. One of the five cases, on account of freedom from other complications, gives data of special importance. If from the actual amount of ash and silica found in this case are subtracted the amounts found in normal lungs, the differences are approximately the same, *i. e.,* the amount of ash in these lungs in excess of what would be present in normal lungs is wholly accounted for as silica. Yet the material inhaled in this case, viz., asbestos, was not free silica, but a complex silicate containing considerable amounts of other oxides besides that of silicon.

One cannot avoid the conclusion that the asbestos has undergone decomposition in the lung, with deposition of SiO_2 and removal of the metallic oxides. Herein is possibly the clue to the production of silicosis; namely that it is due to the chemical action of silica, either inhaled in a chemically reactive form, or liberated *in situ* from inhaled silicates capable of relatively easy decomposition within the lungs. It is notable that in this case there was an interval of six years between the man ceasing work and his dying of asbestosis, and apparently these six years have sufficed for the complete decomposition of the asbestos present in his lungs when he ceased work. No doubt considerable decomposition had already occurred when he gave up this work, since he had been employed in it for a total period of 11 years.

The presence of other disease resulting in the formation of pus, inflammatory exudates, caseous material, etc., all of which would add to the non-siliceous ash of the lungs, prevents our dealing with the analytical data of the other cases in the same way. Three cases in this group, however, are noteworthy in that, following relatively short exposures to risk (4 years, 6 years, 1½ years) and considerable intervals away from the employment (15 years, 15 years, 25 years) death has occurred and evidence of considerable pulmonary asbestosis been obtained. This strengthens the previous conclusion, that once asbestos is present, slow decomposition with the production of active silicosis-producing material, *i. e.,* free SiO_2 in a chemically active form is continually occurring, so that in spite of the abandonment of the occupation the disease slowly progresses.

Silica Dissolved in Lungs?

It is known of course that silica is transported to some extent from the lungs and carried to neighboring lymph glands. It is possible that some may be excreted from the body altogether. It is very probable that silica deposited in the lungs as a result of decomposition of silicates is in a form which will allow of more rapid transportation and possibly excretion than silica originally deposited as such in relatively large, inert particles. Hence it seems very probable that the silica actually found in these cases, in which long intervals have elapsed since exposure to asbestos, is a less correct indication of the actual amount of silica which has been in the lungs than in certain of the other industrial conditions we have mentioned.

Time does not permit me to call attention to the results in other industrial groups, *e. g.,* stonemasons, sand-blasters, coal miners, etc., but there is one other case to which attention must be drawn, that is the abrasive soap worker previously mentioned, who died at the age of 26 of acute silicosis. She had worked in this occupation for three years, after which the illness apparently incapacitated her, as she is reported to have been ill for the three years which intervened between ceasing work and death. There is no evidence of tuberculosis here.

I have at present no information as to the nature of the abrasive used, but it seems to me that the unusually severe silicosis may be connected with the simultaneous inhalation of siliceous material and soap powder, which would give an alkaline reaction. This reaction would, of course, be specially favorable to the decomposition of a silicate or the solution of free silica.

Attention has previously been drawn by Heffernan[1] to the severe and rapid silicosis of workers handling siliceous soap powders and he too ascribes the results to the effect of the products resulting from chemical action between the siliceous material and the alkaline soap powder.

The evidence of this case, therefore, reinforces that of the case of asbestosis I have just mentioned, in indicating that conditions favoring the deposition of silica in a chemically reactive form are those which are most likely to induce rapid silicosis.

The blood plasma has a p_H of 7.3 to 7.5, *i. e.,* is very slightly alkaline and tissue fluids are similarly alkaline. Infective conditions, by promoting inflammatory reactions and therefore an increased supply of blood and tissue fluids to the affected parts, may play their part in determining the progress of silicosis by thus causing an increased supply of slightly alkaline fluid to come into contact with the siliceous material already present in the lungs.

If these views are correct, the materials which we should expect to be most potent as silicosis producers would be the soluble alkali silicates, and it would therefore be of extreme interest to test these views by finding out experimentally what reactions would be obtained in animals which were given these silicates, either by inhalation or intratracheal injection.

[1]Tubercle, 1932, 14, 109.

Grading of Concrete Sands

(A Paper Read by Edmund Shaw Before the Structural Engineers' Association of Southern California)

SINCE 1915, when the writer first became interested, there have been some changes of opinion as to what makes a good concrete sand. At that time most sands produced were too fine, and a little clay was thought to do no harm. Then concrete highway engineers and the fineness modulus theory came along and demanded sand with a high fineness modulus, and we strained ourselves to get the last of the fine grains out. Now a more reasonable view shows us that some fines are necessary and that the gradation of sizes is important.

There is also a more reasonable view of concrete than that of the old "fill-the-voids" theory. It is now recognized that for good concrete every grain of sand should be suspended in cement paste and every piece of coarse aggregate should be suspended in mortar. Concrete is but a special form of masonry. It is poured, not laid. Understanding this has brought the use of higher ratios of mortar to voids. In Los Angeles, where concrete practice is often ahead of the rest of the country, this is shown by the increasing use of 1-2½-3½ mixes, which have a mortar ratio to voids of better than 2, while the much used 1-2-4 and 1-1½-3 mixes have mortar-voids ratios of 1.5 to 1.9 according to the water-cement ratio used.

As the coarse aggregate grains must be surrounded with mortar, so the sand grains in the mortar must be surrounded with cement paste. The best concrete sand, then, will be that which requires the least cement paste, other things being equal. Sands vary widely in the amount they need of cement paste to make a cubic foot of mortar, or, what is the same thing, the number of cubic feet of mortar that can be made from a sack of cement. The following table from tests by J. C. Pearson shows this.

The influence of grading is shown by the column marked F. M. (fineness modulus), this being a figure which increases with the coarseness of the sands. The column showing the percentage of grains passing 50-mesh shows the same thing.

The reason why such sands as Q and R need so much cement paste to make a mortar is that fine sands have more surface per unit of weight than coarse sands, so more paste has to be used to cover them. If not, then the paste has to be stretched with water to cover them. Not only is the strength reduced by doing this, but durability, resistance to frost action and watertightness are very much reduced. The first rule for grading is that the sand should not contain too many fines.

But the cement paste has to fill voids in the sand as well as cover surfaces, and if the voids are too large some of the cement paste in them will do no good. The grading should be one that does not make *large* voids, regardless of the percentage of voids.

Overlarge voids in the aggregate come from what C. A. G. Weymouth calls "particle interference." It is explained mathematically and theoretically in a paper which he published in Rock Products, February 25, 1933. Briefly, the theory says that there should not be such an excess of particles of any sieve size that the particles of the next smaller sieve size cannot pass freely between them. And this applies to all sizes of particles, even to the very fine particles which make up the cement.

If we put coarse aggregate, so badly graded as to have much particle interference, into a box, there will be dense bunches of grains in some parts and large voids in other parts. If the voids are filled with mortar we will have a poor concrete, as only water can leak into the smallest voids, while there will be masses of good mortar supporting nothing in the larger voids. The mass will not be homogeneous. It will be very strong in some parts and weak in others. Some concretes that have been actually mixed and poured are as bad as this.

There are several ideal gradings of aggregates which have been worked out theoretically or from experimental data. The best known in this country are the curves of Fuller, and of Furnass and Anderegg. Weymouth has worked out a curve of a continuous grading in which there is no particle interference. These are shown on the accompanying chart. The Fuller curve (sand portion only) is the modification by H. P. Cortelyou of Los Angeles, which has been so successfully used in city road and bridge work.

It will be seen that these curves are very close together, and the reason that all of them are so successful is that there is little or no particle interference in any of them.

The curve marked "ordinary" is of a sand bought in the open market and tested against the Weymouth grading. In 1-2½-3½ mixes with the same coarse aggregate and a 7-in. slump the strengths were 3110 and 3525 lb. The water-cement ratios were 1.006 and 0.866, a difference of ¾ sack of cement. Particle interference in this sand is shown in the "hump" on the 16-mesh line.

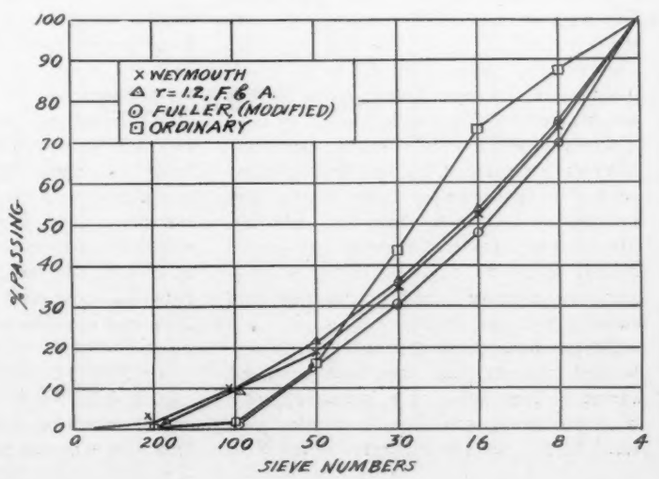
Where particle interference exists its effects can be obviated wholly or in part by the judicious use of fine sand, stone dust or other suitable fine material. It often happens that filling the larger voids with fines in this way will actually reduce the water-cement ratio, in spite of the added surface to cover.

Present day practice calls for more fines in sand than was formerly considered desirable. Some specifications call for 10%-20% passing 50-mesh, and it is the consensus of the opinion of engineers with whom I have discussed the matter, that from 15% to 17% is about right with angular sands.

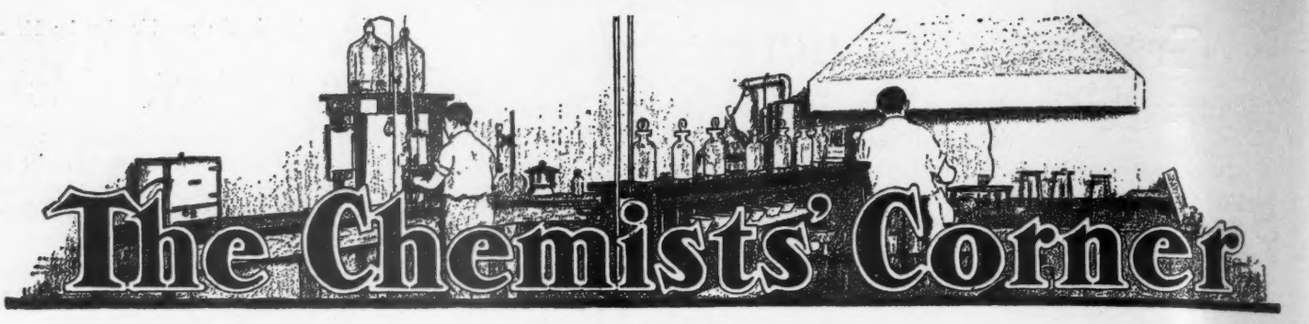
To improve the grading of such sands as the "ordinary" sand mentioned, "plaster" sand is added to increase the fines and a little pea gravel to increase the coarse, thus reducing the high percentages of intermediate sizes. The calculation is neither long nor hard when one is familiar with it. It is done with all aggregates purchased for city work here in Los Angeles, resulting in uniform yield and regular consistency in addition to high strength and durability.

TABLE BASED ON TEST BY J. C. PEARSON

Sand	F. M.	Passing No. 50	28-d. comp. strength	Sand ratio	Cu. ft. sack	Relative cu. ft. sack
Q	1.34	56%	5990 lb.	1.88	2.40	77.5
R	1.58	44%	5610 lb.	1.95	2.30	74.5
T	2.20	25%	5390 lb.	2.16	2.53	82.0
P	2.45	24%	6550 lb.	2.67	2.91	94.0
S	2.58	16%	5460 lb.	3.05	3.09	100.0



Graph showing comparative tests of sands with various grading characteristics



Some Further Data on the New Processed Cements

By Alton J. Blank,

General Superintendent and Supervising Chemist, Cementos Atoyac, S. A., Puebla, Puebla, Mexico—also Chemical Director, Cement Process Corporation

IN AN ARTICLE entitled "Tests of Cement Admixtures," appearing in the "Chemists' Corner" of the October, 1934, issue of Rock Products, S. L. Meyers finds time to say quite a great deal about admixtures to cement in general, and special cements in particular.

Mr. Meyers takes hydrated lime and mixes it together with various types of siliceous materials, takes one volume of the resulting mixtures with two parts of standard Ottawa sand and makes up 2-in. cube test pieces, which he stores in air-tight containers to be tested for strength at various ages. Strength results are practically nil in seven of the twelve tests shown, where hydrated lime is mixed with various of the siliceous materials, while negligible results are had in the remaining five tests. Only one test, where 25% hydrated lime, 25% silica and 50% portland cement are mixed together and heated to 145 deg. C. for one hour, shows any appreciable strength.

In a second series of tests, Mr. Meyers produces two blended cements, one of which consists in grinding together portland cement, sand and hydrated lime at elevated temperatures, and the second consists in grinding the cement and inert materials separately and then mixing them together. Though both mixtures contain approximately 37% of portland cement, the second blend has approximately 30% greater strength than the first.

From other tables blended cements (their composition and method of manufacture not being noted) are generally shown to have higher 1:3 sand mortar strengths, but lower concrete strengths than standard portland cement (composition of latter cement also not given), and from these test data Mr. Meyers concludes that blended and special cements in general are n.g. and not to be in any way compared with the reliable old standby, portland cement.

On the strength of data had upon a few blended cements that have been produced (from written data) on a laboratory scale of experiments, and from conclusions arrived at that are not supported in any way by the test data shown, Mr. Meyers continues with the following comments on "Special Cements": "Recently there has been considerable agitation by engineers and other interested persons for different types of cements to fulfill different concrete requirements. One company has taken advantage of this trend to widely advertise a process in which it is claimed that in grinding portland cement, sand and hydrated lime together at elevated temperatures, a reaction occurs between the sand and hydrated lime which is favorable to the development of strength in the resulting cement. It is difficult to see how mono-calcium silicate could be of great hydraulic help when formed in this way. Being an end product of cement it would be similar to adding completely hydrated cement to normal cement. If unusual strength is developed from this cement it is more likely that in grinding, the cement clinker was ground to a high flour content, while the hard and abrasive sand stayed relatively coarse."

The above conclusion of Mr. Meyers is formed on supposition and theory and backed by a few inadequate laboratory tests that prove nothing.

New Process Cements

Initial experiments carried out by the writer in developing the new special cements, that Mr. Meyers refers to, were started upon much the same lines and carried out along the same procedure as the several tests that Mr. Meyers reports. Several hundred tests made, in which hydrated lime was ground with siliceous, or acid materials, in small laboratory mills, yielded products having negligible strengths. On the other hand, heating together a slurry composed of hydrated lime and diatomaceous earth and other acid materials, showed that reactions took place between the lime and silica and alumina components of the mixture.

Attempting to check these laboratory findings, a great number of tests were carried out by which varying amounts of hydrated lime with siliceous materials were placed in a 12 in. x 24 in. mill loaded with grinding media. The mill was sealed, a brick housing built around it, oil burners installed, and grinding was carried out under temperatures ranging up to 500 deg. C. The resulting products, though having some strength and setting properties, could not be termed or compared with cements as generally used for concrete purposes.

On the other hand, tests carried out upon a cement plant scale of operation whereby hydrated lime and diatomite, or other acid materials were ground together under conditions which involved the control of moisture temperature, time limit of grinding and fineness, gave products possessing fair setting and strength properties. A great number of mill tests carried out in this manner, with variations as to the kinds and quantities of materials and control exercised, definitely proved that combinations of reactions between the lime and siliceous materials took place and gave to the resulting products desired properties.

Further tests in which caustic lime was hydrated and ground with siliceous materials in the mill under controlled moisture, temperature, time limit and fineness conditions, gave products having normal setting properties, somewhat slow hardening qualities, but strength results that approached that of standard portland cement at later ages.

Believing that the above method of hydrating and grinding in one procedure could be improved upon and still better products obtained by following the control as outlined, a screw-type hydrator from 14 in. to 36 in. in diameter by some 125 ft. in length was constructed and installed so as to discharge directly into the screw feeding the 5 ft. 22 in. tube mills in use.

Caustic lime 3 in. and down from the rotary lime kiln was passed through a hammer mill and discharged into a common elevator at which point volcanic river sand fed from a poidometer was also discharged, the materials in turn being discharged into the hydrator at which point sufficient water was added to hydrate the lime and promote the initial reactions between the lime and silica.

The temperature of the mixture in the hydrator, depending upon the amount and quality of caustic lime, ranged between 100 and 150 deg. C., and the amount of water added was considerably in excess of that required for just the hydration of the lime. At the point where the reacted material was discharged into the feed end of the tube mill further water was added when necessary to retain the desired amount of moisture in the material during the grinding procedure. Grinding was carried out at temperatures ranging between 150 and 300 deg. C. in the mill, this being controlled by the amount of material and grinding media in the mill, and varied to maintain desired conditions.

The products resulting from these tests were found to be superior to those produced initially under the more crude conditions of control.

Still further tests were carried out in which catalyzers, such as sodium chloride, sodium carbonate, calcium chloride, tannic acid, etc., were dissolved in minute quantities in the water used for hydration purposes. These resulted in further accelerating reactions between the lime and acid mixtures and in the formation of other definite properties that gave to the resulting products desired setting and strength properties.

It was further found that by adding varying amounts of portland cement clinker, with its normal gypsum content, to the hydrated materials after the hydrating procedure and just prior to the grinding stage of the process, that products definitely superior to portland cement were had.

New Cements Much in Demand

In the one and one-half years that the processed "Atoyac" cement has been on the Mexican market competing with standard portland cements, the new cement has definitely established its quality as being superior to the standard portland cements with which it competes, and has greatly surpassed standard portland cements in the number of uses to which it can be put, and it is no longer in its experimental stage as Mr. Meyers and others would have it appear. In the first six months that "Atoyac" cement was on the market at least 10,000 metric tons were used in the Mexico City market alone for normal and special concrete constructions. Its uses include dam construction, drain tile for use in alkali ground areas, roads, railway ties, transmission posts, building blocks, general reinforced-concrete construction, and in such delicate works as the manufacture of colored mosaics, statues and artificial marble creations.

A masonry product, manufactured under the same process and marketed under the trade name, "Plastocement," has also definitely established its quality as being superior to standard portland cement used alone or with hydrated lime in the masonry field. The demand for this second product has resulted in the necessity of placing in operation a second hydrator-mill installation, and in excess of 1000 metric tons monthly are used in the Mexico City district alone for ordinary masonry construction, such as bricklaying mortar, rough and smooth wall plastering, stuccoing, and in some cases for rough concrete purposes.

Thorough tests over a sufficient period of time and carried out under the most severe methods of test have shown "Atoyac" cement to be definitely superior to standard portland cement in strength and durable properties; to have only about 50% of the heat developed by portland cement during hardening; to be more resistant to the action of alkali ground and sea waters, and, with slight variations as to proportionment of materials and control exercised during the manufacturing procedure, an all-purpose cement is had.

While the statement by Mr. Meyers to the effect that high-pressure salesmanship, use of most favorable results from a mass of data with essential factors left out, has resulted in the conversion of certain interests to the use of admixtures (and possibly, special cements, though he does not state himself clearly on this) may be true in certain isolated cases, such tactics are not usually resorted to by long established concerns producing cements who year in and year out enjoy increasing demands for their products, whether the product be the standard portland cement, the new special cements with which it now tries hard to compete, or the masonry cement with which it cannot successfuly compete.

In order that there may be no doubt in the mind of the reader as to the accuracy of Mr. Meyers' statement and further farfetched remarks in this connection, full data is given herewith on the average Landa portland cement, "Atoyac" cement, and the masonary product, "Plastocement" over a period of fifteen months to date.

TESTS OF LANDA PORTLAND CEMENT
(15 Months' Average)

	Chemical analyses
SiO_2	21.88%
R_2O_3	9.14%
CaO	61.41%
MgO	2.36%
SO_3	2.56%
Ign. loss	2.01%
	Physical tests
Specific gravity	3.10
Initial set	2 hr. 37 min.
Final set	4 hr. 28 min.
Fineness No. 200 mesh	90.9 %
Normal consistency	24 %

Tensile strength 1:3

Age	Lb. per sq. in.
24 hours	273
3 days	347
7 days	394
14 days	443
(a) 28 days	465
(b) 3 months	509
(c) 6 months	515
(d) 1 year	527

Note: (a) only 14 months' average.
(b) only 12 months' average.
(c) only 9 months' average.
(d) on'y 3 months' average.

TESTS OF ATOYAC CEMENT
(15 Months' Average)

	Chemical analyses
SiO_2	26.18%
R_2O_3	10.70%
CaO	55.59%
MgO	1.97%
SO_3	2.09%
Ign. loss	3.49%
Insoluble residue	14.02%
	Physical tests
Specific gravity	2.93
Initial set	2 hr. 25 min.
Final set	4 hr. 54 min.
Fineness No. 200 mesh	93.7 %
Normal consistency	27 %

Tensile strength 1:3

Age	Lb. per sq. in.
24 hours	225
3 days	314
7 days	370
14 days	433
(a) 28 days	461
(b) 3 months	512
(c) 6 months	543
(d) 1 year	607

Note: (a) only 14 months' average.
(b) only 12 months' average.
(c) only 9 months' average.
(d) only 3 months' average.

In the production of "Atoyac" cement, the 15 months' average test data of which are shown above, caustic lime was hydrated in the presence of siliceous sand of a volcanic origin and ground with approximately 67% of portland cement clinker under the usual conditions followed in the process where moisture, temperature, time limit and fineness control was exercised.

As claimed for the product, and verified by the test data as shown above, "Atoyac" cement shows a greater gain in strength after the 28-day test period than is had by standard portland cement, thus being more durable and having less tendency towards retrogression than the normal portland cement.

TESTS OF MASONRY PRODUCT PLASTOCEMENT
(15 Months' Average)

	Chemical analyses
SiO_2	24.04%
R_2O_3	9.45%
CaO	53.68%
MgO	1.61%
SO_3	1.15%
Ign. loss	9.29%
Insoluble residue	20.66%
	Physical tests
Specific gravity	2.61
Initial set	3 hr. 42 min.
Final set	8 hr. 53 min.
Fineness No. 200 mesh	92.0 %
Normal consistency	36.3 %

Tensile strength 1:3

Age	Lb. per sq. in.
24 hours	56
3 days	81
7 days	121
14 days	133
(a) 28 days	201
(b) 3 months	257
(c) 6 months	346
(d) 1 year	404

Note: (a) only 14 months' average.
(b) only 12 months' average.
(c) only 9 months' average.
(d) only 3 months' average.

In the production of "Plastocement," the 15 months' average test data of which are shown above, the proportions of materials were, roughly, 75% caustic lime with 25% siliceous sand, ground with approximately 9.8% of portland cement clinker under the usual procedure and control exercised in the process.

In the production of "Atoyac" cement the

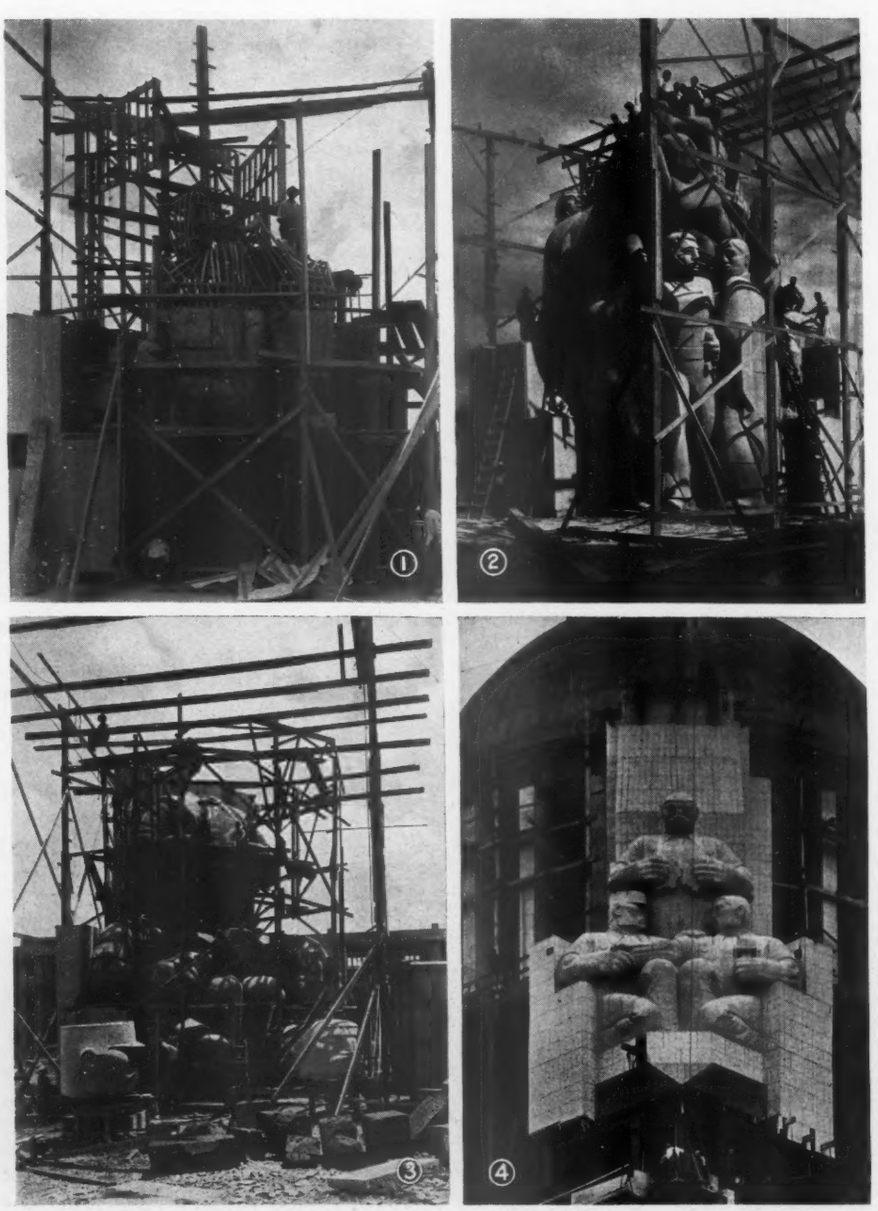
proportions of caustic lime and siliceous sand were reversed.

If, as Mr. Meyers suggests, the process of hydrating caustic lime in the presence of siliceous or acid materials and then grinding with portland cement clinker under the usual control of *moisture, temperature, time limit* and *fineness,* is not productive of hydraulic results, the writer would appreciate very much his explanation, theoretical, suppositionary or otherwise, as to why "Atoyac" cement with only 67% of portland cement clinker present, has a strength of 15% greater than the portland cement manufactured from the same clinker at the age of one year. The writer would also like to have Mr. Meyers' version as to why "Plastocement," containing only 9.8% of portland cement clinker, has a strength of 76% of that obtained with the portland cement manufactured from the same clinker, at the age of one year.

An Invitation to Mr. Meyers and Other Skeptics!

Mr. Meyers is invited to pay the Puebla plant of Cementos Atoyac, S. A., a visit and inspect the equipment and various types of materials that have been used during the past several years to produce the new cement. There will be placed at his disposal every facility for the carrying out of any tests on a mill scale of operations that he may be interested in.

Laboratory tests and experiments yield one type of result, whereas mill type experiments yield another type of result. The production of the new special cements under the process which Mr. Meyers has seen fit to criticize has long since passed the experimental stage.



Examples of the use of "Plastocement" in the Monument to the Revolution in Mexico City—stucco on wood framework

Lime News Briefs

Canada: Production of lime in Canada in 1933, including both quick and hydrated, amounted to 323,540 tons, valued at $2,432,306, as compared with 320,650 tons at $2,394,537 in 1932 and 344,785 tons worth $2,764,415 in 1931, according to finally revised statistics issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. Producers received an average of $7.30 per ton for quicklime and $8.57 for hydrated lime, as compared with $7.14 and $9.14, respectively, in 1932; corresponding prices in 1931 were $7.38 and $10.71. In 1933 the 60 plants in the industry employed $8,920,042 in capital, paid $480,833 in salaries and wages to 696 employes and consumed $473,125 worth of fuel and electricity.

◈ ◈ ◈

National Lime and Stone Co., Spore, Ohio, entertained its employes and their families at a Sunday picnic in the G. V. Harer woods, just north of the plant. The afternoon was spent socially, pitching horseshoe, boating, swinging and playing ball. About 175 partook of the supper, which was served at four-thirty, and consisted of fish, pork, baked beans, buns, bread, butter, celery, tomatoes, mustard, catchup, pickles, milk and coffee. This is the first gathering of this kind in the history of the Spore plant and as those who were present enjoyed themselves so much, it is hoped that more will be held in the future, according to a local newspaper. The supper was all furnished by the stone company.

◈ ◈ ◈

Sylacauga, Ala.: E. M. Confer, Siluria, Ala., and D. G. Wallace, Colera, Ala., are reported to be interested in establishing a new lime plant.

◈ ◈ ◈

Storey Lime Co., Perkinsville, Ariz., producers of crushed lime, lump lime, and smelter flux, has opened a branch office in Phoenix and is doing a general wholesale lime business. Alfred Paul, Sr., Douglas, is president and general manager of the company and Alfred Paul, Jr., also of Douglas, is vice-president. J. T. Sheffield is secretary and treasurer.

◈ ◈ ◈

United States Geological Survey has published results of a study of the chemical composition of the public water supplies of 670 places, which serve 56,000,000 consumers. The supply systems are described briefly in the table as to source and treatment. The accompanying text carries a brief discussion of the treatment of public, industrial, and domestic supplies, without reference to questions relating to sanitation and health. The data for the individual supplies are summarized in several smaller tables, especially with reference to hardness. A map indicates the weighted average hardness by states of the supplies for which analyses are given. This publication should be of practical value to lime manufacturers in developing markets for lime for water treatment.

Rock Products News Briefs

Crushed Stone

Silverdale Stone Co., Silverdale, Ark., has been sold by the Arkansas City Sand and Gravel Co., Arkansas City, Ark., to Wm. Quiring, Wichita, Kan., and C. H. Hockenberry, Silverdale. The new owners of the quarry are making some improvements in the place and plan to establish a park, work on which has already begun. A large lake also will be built there by the owners of the stone business. Mr. Quiring is connected with the Wichita Marble Co., but will spend a part of his time at Silverdale. One of the projects in connection with the lake is that building sites for cabins will be sold around the lake and stone for the cabins furnished free of charge from the quarries.

◈ ◈ ◈

New Enterprise Stone and Lime Co., Everett, Penn., has purchased the Ashcom limestone quarry, near Everett, from the Everett-Saxton Co. Included in the purchase was the Ashcom quarry, the plant, a farm and 11 dwellings. The New Enterprise company also owns limestone quarries at Roaring Spring and Waterside and a sand bank at Everett. The owners of the company are Arthur Furry, J. F. Detwiler, Paul Detwiler and Dale Detwiler.

◈ ◈ ◈

Beloit, Wis.: According to local newspapers 39% of the relief labor in the county is employed grinding agricultural limestone for farmers at 35c per cu. yd. or 26c per ton, f. o. b. portable plant, to farms. The papers say that 250 men produce 2000 cu. yd. per week. At 50c per hour, 30 hours per week, the labor cost alone amounts to $3750, or $1.88 per cu. yd. It is obvious that this labor cost is entirely ignored in setting the price to farmers—because it comes out of FERA funds.

◈ ◈ ◈

Quartzite Stone Co., Lincoln, Kan., was reopened late in September with about 50 men reëmployed. E. W. Forney is superintendent. The company is putting on larger trucks for hauling the stone from the pits to the crusher and installing an 18-ton scale for weighing the rock, replacing the 6-ton scale that has been used.

◈ ◈ ◈

Lima Stone Co., Lima, Ohio: Sale of the assets of the company to its bondholders was authorized by Judge Everett in the Allen county common pleas court. The sale, which followed a receivership action, was made for not less than $30,000, the exact amount to be determined from the receiver's report of the company for September. Outstanding mortgages totaled $110,000 and debts nearly $25,000.

◈ ◈ ◈

Oskaloosa, Iowa: Even quarry owners in the country may be sued for damages on account of blasting. A farmer has sued Eldert Groenendyke, local crushed stone producer, for $350. The farmer's contentions are: He operates an 80-acre farm, asks that Groenendyke be enjoined from blasting rock on the quarry which has resulted in $100 damage to plaintiff's pasture land from rock blown there, $100 damage to livestock from injury and fright, and $150 damage to the peace and quiet of his home. He has asked Groenendye to refrain from the blasting but Groenendyke has refused. The farmer alleges that his livestock has been injured from running against objects in their fright and that he has been forced to keep them locked up during the day and released to the pasture only at night.

◈ ◈ ◈

Big Rock Stone and Material Co., Little Rock, Ark., has purchased the Amesite cold-mix asphalt plant at 15th and Pike Ave., North Little Rock. The company operates another Amesite plant at Baring Cross.

◈ ◈ ◈

Milton, Iowa: Van Buren county farmers, who are paying their obligations to the relief administration for seed and feed received this spring and summer by working on relief projects, are now engaged in top-stripping at the stone quarry, located on the state park road. The rock will be crushed and used to surface a half-mile road.

◈ ◈ ◈

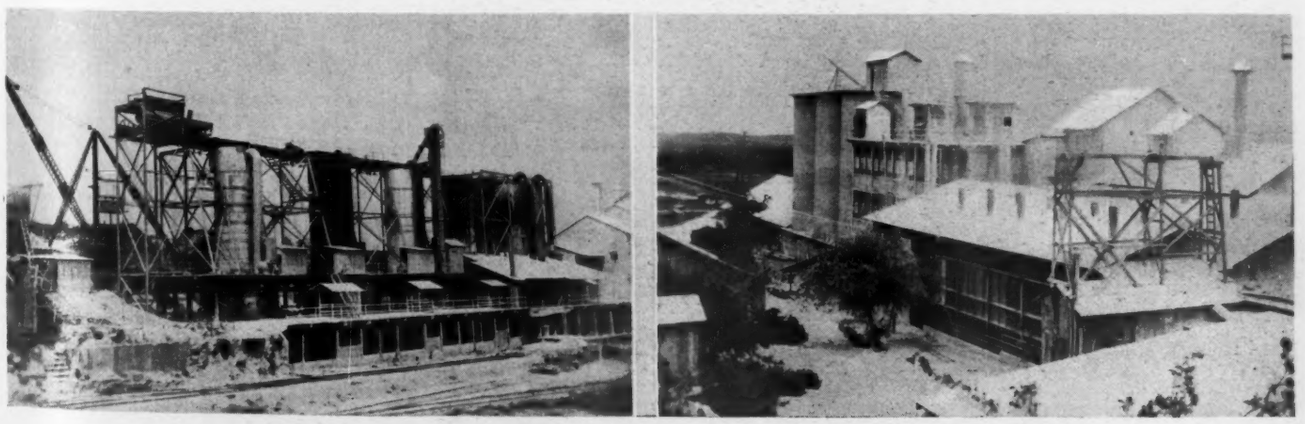
Pasadena, Calif.: An appropriation of $40,000 to finance exploration of a new quarry site for San Gabriel Dam No. 1 was voted by the county supervisors recently. This sum will go to the West Slope Construction Co., which will prospect the proposed Bichota quarry, seven miles north of the dam. The present quarry, adjoining the Pasadena Morris dam, has given the county so much trouble and has proved so inadequate as to compel seeking a new quarry site. The $40,000 will be listed as an "extra" in the contract held by the West Slope Construction Co. for San Gabriel Dam No. 1. It will cost $1.50 more per cu. yd. for quarrying rock in event the Bichota Canyon site is selected.

Lime

United States Gypsum Co., Chicago, Ill., has purchased the Dittlinger Lime Co., New Braunfels, Tex., and effective October 1 the plant will be operated as the Dittlinger Lime division of the U. S. Gypsum Co. No change in personnel is contemplated. The Dittlinger Lime Co. is one of the oldest in Texas and has been a prominent manufacturer of high calcium chemical lime for many years, as well as a leading producer of lime for the Texas building construction industry.

Gypsum

United States Gypsum Co., Chicago, Ill., has asked the Iowa state tax board for exemptions from paying the sales tax on electricity used by its plants in producing gypsum products. The company, which operates factories at Fort Dodge and Centerville, Ia., claimed at a hearing before the board that the electricity was used in "processing" and was therefore non-taxable. After requesting briefs be submitted, the board took the case under advisement.



Dittlinger Lime Co. plant, New Braunfels, Tex., purchased by U. S. Gypsum Co.

Hints and Helps for Superintendents

Simple Things Save Big Money

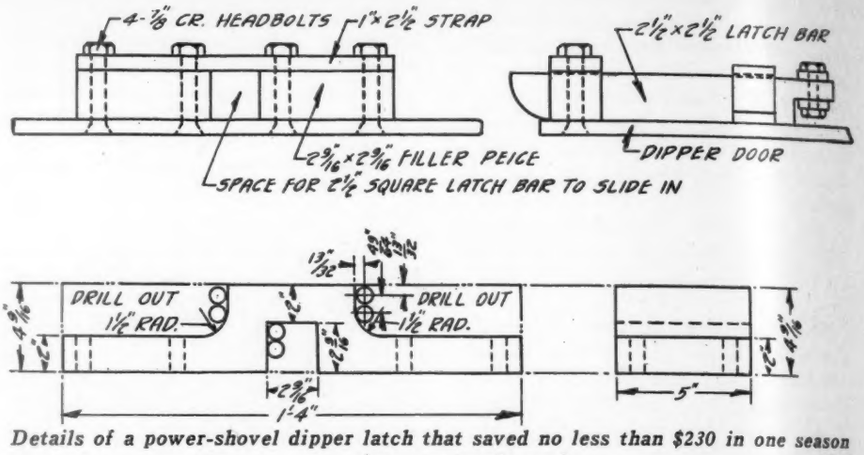
By C. H. Wright,
Snyder, N. Y.

JUST consider the saving connected to this particular little piece of mechanism. This shovel-dipper latch bar guide that the young man is pointing at is in reality a part of a 5-in. x 5-in. square steel A-frame leg, sawed off to the proper length, carefully laid out, drilled and machined for smoothness, where the latch bar of the dipper has to move when dumping the dipper, and also to make it easy for the man controlling the operation of the dipper.

First, this little sketch will show what we used on the dipper and the results. Any person who has had the experience of working in stone quarries or really any place where rock excavation is being done, can really understand why the operation of machinery such as steam shovels is so severe on all working parts, especially the dipper.

The bolts had to be made with countersunk heads and the bolt holes in the dipper door had to be counter-sunk to fit the heads of the bolts, as the rock being dumped from the dipper would break off the heads of the bolts. It has been necessary frequently to put in new bolts to take the place of ones that were battered loose by dropping the dipper on the rock. Very often before the old bolts could be removed they had to be burned off with the acetylene torch, or with plenty of hard work with sledge and cold chisel cutter, which was rather expensive.

Sometimes two bolts would break off at one time, falling out and loosening the 2 9/16-in. filler pieces, thus causing a rather foolish delay and perhaps breaking or bending the latch bar.



Details of a power-shovel dipper latch that saved no less than $230 in one season on maintenance and repair

How to Make It

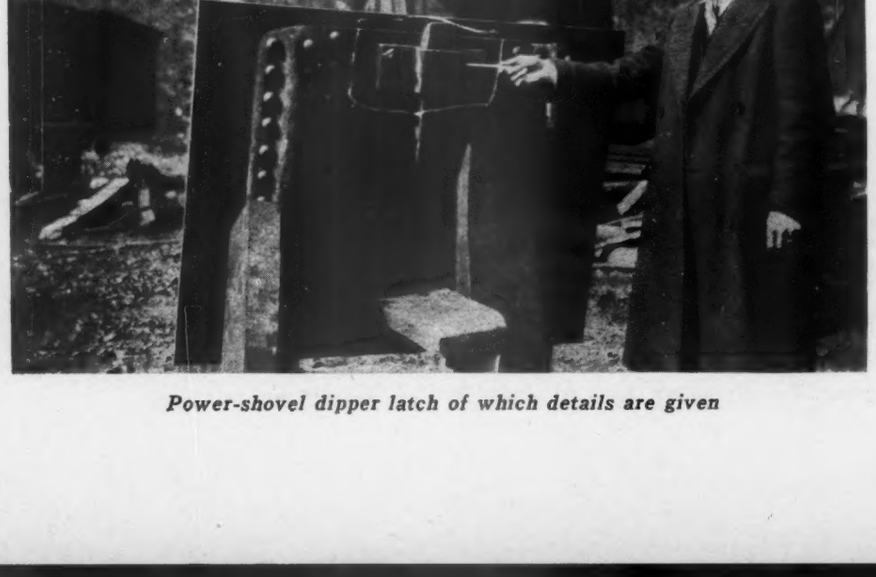
With the following arrangement the former bad results do not occur, as the stone or material cannot easily come in contact with the rivet heads, the holes in the dipper door being counter-sunk and the rivets being driven from that side, making a smooth surface for the material to slide over. The easiest way to make this device is to saw off or burn off the proper length required, lay-out and drill to very near the shape to which the piece is to be made, then mill out or plane out that part where the latch bar has to slide in, making it easy for a man to dump the dipper.

A piece of 5-in. by 5-in. broken A-frame leg may be used to good advantage. If one wishes to drill this, an easy formula is given here: Mark off in heavy lines the shape desired, then strike a light line outside of heavy line using a ¾-in. drill; lay out first hole 13/32 in. from the edge of material and 13/32 in. from heavy line, center punch and lay out the rest of the holes with a pair of dividers set at 49/64 in. After all the holes are drilled, it is very easy to break out the piece not to be used, and the shape for the latch bar guide is very nearly finished. Machine drilled surfaces and drill holes in guide correspond with holes in dipper door. To make this guide requires only about 2 hours and 30 minutes with proper equipment to do the work.

We have one of these on each of our large steam shovels and they have been in use several months and have cost the company only the installation, whereas the old built-up affair required an hour and sometimes longer each Sunday that there happened to be any other repairs being done. Taking everything into consideration, this new latch would be cheap if it required a week to make, with all the shop force working on it.

Saved $230 in One Season

In one season alone the old latch bar guide cost the company in men's wages alone just $230, not saying what the company lost during working hours for repairs. And if a person were to figure up the actual cost that a company is deprived of in production, it's a question, would the heads of a company think it wise to give their investigating committee a little exercise?



Power-shovel dipper latch of which details are given

Saving Time in Starting Diesel Engine

By John K. Spicer,
Spicer Gravel Co., Marseilles, Ill.

ANYWHERE from 15 to 30 minutes have been required in the past to start our main power unit, a 100-hp. semi-Diesel, and to prime the pump.

The first job was filling the Diesel with water. This was done with a small pump. Then the compressor had to be started to make enough air to run the torches and turn the engine over.

We installed a barrel up over the Diesel with pipe connections down to the water leads. This barrel was filled from the small pump the first time. Now to fill the engine necessitates opening one valve and closing one.

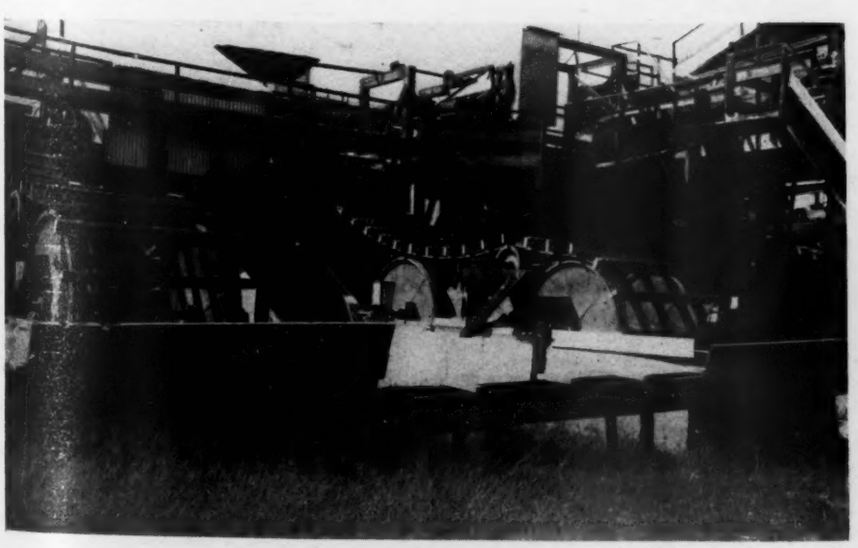
An extra air tank was installed along side of the old one, giving us double the old air capacity. It is no longer necessary to run the compressor before we can start the Diesel. With 180 lb. of air we have enough to furnish the torches and turn the engine over for starting. After the engine is running the operator has plenty of time to start the compressor and bring the air back up to the required amount. Likewise the barrel can be filled from the circulating pump of the Diesel, by opening the lead valve.

The 8-in. gravel pump was primed before by the compressor after the Diesel was running. Now it can be primed while the torches are warming. These small changes have cut the time required to start down to about five minutes, a gain more than worth all the time and money spent on the change.

Tap Waste Water Pipe Line for Mason's Sand

AT THE sand and gravel plant of the Watauga Stone Co., near Elizabethton, Tenn., the fines from a Gibert screen are flumed to large, home-made sand drags located on the ground beside the plant. One interesting feature of this drag is the use of railroad rails laid length-ways of the bottom on the inclined portion of the drag to prevent excessive wear from the action of the sand. The overflow from the first drag is carried to a second sand drag exactly like the first one, and the sand from the latter falls to a stock piling conveyor.

A 6-in. Wilfley sand pump, operating from a sump beside the sand drags, takes the waste water from the drags and pumps it back to the river through an overhead pipe-line. A number of small nozzles along the underside of this pipe "bleed" it and cause a deposit of sand to be laid down under the pipe. This material is very fine and clean, and is used for brick mason's sand. When the plant is operating regularly this pile will be built up all the way to the pipe or about six feet above the ground. Since the pipe is laid along the railroad siding, it is easy to load this material directly to cars, wheelbarrows and an inclined ramp usually being used for the work. The company has done a good business with this fine sand.



Home-made sand drags classify and dewater sand

Superintendents!

THE EDITOR pays a minimum of $5 for each contribution to these pages—paid on receipt of the contribution. Why not send one in and get a Xmas present for the kiddies?

Saving Wear on the Ramp Cable

WHERE CARS are hauled up the ramp of a quarry or sand plant it frequently is necessary to have a pulley wheel at the head of the incline just above the point of dumping. This wheel is, of course, used to change the direction of the pull from inclined upward to a horizontal direction.

Pulley with spring to follow travel of cable

If the ramp has two tracks, one for loaded cars coming up and the other for empties going down, it is likely that the pulley will bind considerably since it can not possibly be lined up with both of these tracks.

To overcome this difficulty the Camden Gravel Co., Camden, Tenn., mounted the pulley at the head of its ramp so that it would slide back and forth in its bearings for a distance of about six inches, which was sufficient to keep it lined up with either track on the ramp. Then a heavy coil spring was placed on the shaft between the wheel and one bearing, so that the pulley would be held way over to one side unless moved across against the spring. Thus it is lined up with the track for empty cars, but when the cable pulls a full car up the ramp the weight is sufficient to move the wheel over and line it up with the other track. The saving in wear on the cable and pulley wheel has been considerable.

Sand and Gravel Statistics*

A Great Increase in Government-Produced Material in 1933

THE TOTAL sand and gravel reported as sold or used by nearly 2000 commercial producers in the United States in 1933 amounted to 66,106,472 short tons valued at $39,395,027, a decrease of 22.5% in quantity and 17.0% in value from 1932. In addition, production of sand and gravel from more than 550 state, county, and municipal operations was reported to the Bureau of Mines; the quantity of this material totaled 41,648,877 short tons and the value $13,677,883, increases from 1932 to 19.9% and 36.3%, respectively. The total output of sand and gravel accounted for in the canvass by the Bureau of Mines for 1933 was therefore 107,755,349 short tons valued at $53,072,910.

Because of the sharp increase in production reported by non-commercial agencies, this total is slightly higher than the preliminary figure of 104,000,000 short tons released by the Bureau early in 1933. The output reported by commercial plants, however, was 6.9% lower than that indicated by preliminary data.

Non-commercial Production

Complete statistical coverage of sand and gravel production by states, counties and municipalities is impossible without a large expenditure for field work. For 1933, however, a special attempt was made to canvass every local government agency and, as a result, returns from many additional counties or municipalities are included in the total of 41,648,877 short tons of material included under non-commercial. Returns from only those sources comparable to 1932 indicate that non-commercial production in 1933 was virtually equal to that in 1932; the increase in 1933 can be attributed directly to more complete statistical coverage.

Less than one-third, 8,057,448 short tons in 1932, and 13,645,409 short tons in 1933, of the sand and gravel produced by government agencies is washed, screened, or otherwise prepared to make it comparable in quality with the output of the average commercial plant. By far the larger part consists of pit-run material having a low unit value. The average value of all non-commercial sand and gravel in 1933 was $0.33 a ton contrasted with $0.60 a ton for the commercial output.

Railroad Ballast

All railroad ballast is included in this report under commercial production. In 1933, 1,232,795 short tons of ballast gravel valued at $0.20 a ton was produced by or directly for the railroads for their own use. This quantity is equivalent to 22.7% of total ballast gravel.

Preparation

The percentage of prepared material included in the total for sand and gravel dropped to 66.9% in 1933, principally as a result of the increase in quantity of unprepared material reported by government agencies. This prepared sand and gravel (72,058,631 short tons) includes only 13,645,409 tons contributed by non-commercial sources. Prepared material in 1933 comprised 88.4% of commercial production but only 32.8% of the non-commercial output.

Transportation

Producers were asked to report the method of transporting their product during 1933. Replies received covered 98,482,383 short tons—91.4% of the total recorded production of sand and gravel. Of this quantity 8% was transported by waterway, 32% by rail, and 60% by truck.

Salient statistics of the sand and gravel industry for 1932 and 1933 are summarized in the accompanying table.

*By H. H. Hughes and M. Allan.

Sand-Lime Brick Production and Shipments in September, 1934

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Nine sand-lime brick plants reported for the month of September, this number being one more than the number reporting for the month of August, statistics for which were published in October.

Average Prices for September

Shipping point	Plant price	Delivered
Grand Rapids, Mich..	.....	$12.00
Detroit, Mich.	$9.25–10.25	10.50–11.50
Mishawaka, Ind.	9.25	.....
Syracuse, N. Y.	14.00	16.00–20.00
Saginaw, Mich.	10.50	.....
Madison, Wis.	.....	15.00
Toronto, Ont., Can....	12.00	13.50

Statistics for August and September

	August	September
Production	†1,137,100	*1,163,520
Shipments (rail)	45,000	42,000
Shipments (truck)	1,045,458	1,121,032
Stocks on hand	1,959,116	2,090,778
Unfilled orders	148,000	140,000

†Eight plants reporting; incomplete, three not reporting unfilled orders.

*Nine plants reporting; incomplete, four not reporting unfilled orders.

The Sioux Falls Pressed Brick Co., which reported in addition to the nine plants mentioned above, stated that it had not yet rebuilt since it was destroyed by fire on December 4, 1933. However, it expects to rebuild to take care of PWA jobs in 1935.

SAND AND GRAVEL SOLD OR USED BY COMMERCIAL AND NON-COMMERCIAL PRODUCERS IN THE UNITED STATES, 1932 AND 1933, BY USES

Use	1932 Short tons	1932 Value Total	1932 Value Avg.	1933 Short tons	1933 Value Total	1933 Value Avg.	Pct. of change in Tonnage	Pct. of change in Total value
Com'l Operations:								
Sand:								
Glass	1,370,255	$ 2,266,564	$1.65	1,781,423	$ 3,011,023	$1.69	+30.0	+32.8
Molding	1,118,146	1,051,702	.94	*1,718,251	*1,558,738	.91	+53.7	+48.2
Building	14,597,631	7,507,700	.51	*13,024,174	*6,496,180	.50	—10.8	—13.5
Paving	17,194,553	7,622,597	.44	10,903,447	5,544,368	.51	—36.6	—27.3
Grinding and polishing	419,691	638,556	1.52	572,735	739,222	1.29	+36.5	+15.8
Fire or furnace..	36,698	54,371	1.48	*106,133	*121,149	1.14	+189.2	+122.8
Engine	1,151.011	688,563	.60	*1,051,695	*623,285	.59	— 8.6	— 9.5
Filter	68,035	92,751	1.36	24,387	52,186	2.14	—64.2	—43.7
Other†	4,486,655	1,463,650	.33	*1,842,652	*695,189	.38	—58.9	—52.5
Total sand	40,442,675	$21,386,454	$0.53	31,024,897	$18,841,340	$0.61	—23.3	—11.9
Gravel:								
Building	13,064,368	$ 9,549,698	$0.73	11,934,080	$ 8,084,995	$0.68	— 8.7	—15.3
Paving	25,137,550	14,728,893	.59	17,719,859	10,403,150	.59	—29.5	—29.4
Railroad ballast‡.	6,644,483	1,823,993	.27	5,427,636	2,065,542	.38	—18.3	+13.2
Total gravel.....	44,846,401	$26,102,584	$0.58	35,081,575	$20,553,687	$0.59	—21.8	—21.3
Total sand and gravel	85,289,076	$47,489,038	$0.56	66,106,472	$39,395,027	$0.60	—22.5	—17.0
Non-commercial Operations:§								
Sand:								
Building	147,636	97,283	$0.66	163,257	$ 84,131	$0.52	+10.6	—13.5
Paving	2,204,564	1,013,337	.46	1,972,692	751,201	.38	—10.5	—25.9
Total sand	2,352,200	$ 1,110,620	$0.47	2,135,949	$ 835,332	$0.39	— 9.2	—24.8
Gravel:								
Building	1,000,702	253,931	$0.25	650,873	$ 253,529	$0.39	—35.0	— 0.2
Paving	31,395,919	8,668,487	.28	38,862,055	12,589,022	.32	+23.8	+45.2
Total gravel	32.396.621	8,922,418	$0.28	39,512,928	$12,842,551	$0.33	+22.0	+43.9
Total sand and gravel	34,748,821	$10,033,038	$0.29	41,648,877	$13,677,883	$0.33	+19.9	+36.3
Com'l and non-com'l operations:								
Sand	42,794,875	22,497,074	$0.53	33,160,846	$19,676,672	$0.59	—22.5	—12.5
Gravel	77,243,022	35,025,002	.45	74,594,503	33,396,238	.45	— 3.4	— 4.7
Grand total.....	120,037,897	$57,522,076	$0.48	107,755,349	$53,072,910	$0.49	—10.2	— 7.7

*To avoid disclosing figures, small amounts of molding, engine, and fire or furnace sands are included with building and other sands.

†Includes some sand used for railroad ballast and fills. The quantity of sand reported as used exclusively for railroad ballast was as follows: 1932, 995,783 tons valued at $184,196; 1933, 500,137 tons valued at $152,882.

‡Includes some gravel used for fills and other purposes. The quantity of gravel reported as used exclusively for railroad ballast was as follows: 1932, 5,113,862 tons valued at $1,513,240; 1933, 4,668,597 tons valued at $1,747,452. The foregoing figures for ballast include that produced by railroads for their own use, amounting in 1932 to 2,140,154 tons valued at $293,328; in 1933 to 1,232,795 tons valued at $247,522.

§By states, counties, municipalities and other government agencies, directly or under lease.

Editorial Comments

Government Competition

The statistics of sand and gravel production in 1933, on the opposite page, are proof enough of the inroads on private business in this industry by various agencies of local, state and national government. Elsewhere in this issue is the story of how cement manufacturers in the South have staved off more government competition only by a surrender of the possibility of a profit on the TVA's cement requirements. Yet the President, Mr. Richberg, Secretary Perkins, Secretary Roper, and other high administration officials continue to harp on the desirability, if not actual necessity, of business profits!

Other industries are beginning to feel the effects of government competition, and have been very vocal in their protests—so much so that FERA plans for engaging in numerous lines of production are said to have been abandoned. In most of these other industries the excuse was to provide merely employment for idle hands; in the rock products industry, so far as newspaper viewpoint goes, the excuse has almost invariably been "to save money."

We get innumerable newspaper clippings in which government officials boast of their "savings" because of these producing activities. We practically never see these statements refuted, as any interested local producer might readily do. Therefore, the public generally believes that its agencies *do* pay too much for these materials. One-sided propaganda, however untrue and lacking in foundation, does ultimately mold definite public opinion.

Seldom do producers get together without a discussion of this problem and more or less violent denunciation of the unfairness of it all. We are told the NRA authorities are sympathetic to the producers' viewpoint, but are helpless because NRA has no jurisdiction over local or state governmental agencies. The FERA takes no responsibility for such local activities although it furnishes the money to promote them.

It seems to us there are but two ways to attack these abuses of government power which deprive legitimate business of both production and profits. One is an appeal to the courts as local taxpayers on grounds that local governments do not have the legal right to deprive such taxpayers of their means of earning a living; on grounds that as a matter of equity they can not be taxed to supply funds for competition against themselves, and on the grounds that such use of public funds constitutes class discrimination.

We do not profess to know the law, but all civil law is presumably founded on equity, and the inequity of the present situation is so easily proved that it is hard to see how a court of civil justice, so-called, could ignore it. A typical example is furnished in Wisconsin today where FERA money is used to pay labor to produce agricultural limestone for farmers, at a price that can not much more than pay for power. The labor cost of $1.75 per ton is completely ignored, because is it "relief labor."

The constitution of Wisconsin, and of most of our states as well, is designed to protect its citizens from "class legislation," or class discrimination. This was definitely decided by the state supreme court some years ago when it held that coöperative marketing associations could not be confined exclusively to farmers, but could be formed of producers or marketers in all lines of industry; for were it otherwise farmers would become a specially privileged class, contrary to the state constitution. It would seem that if agricultural limestone producers were to take their case to the same court, it would not be hard to prove that selling at 35c per ton, to farmers, limestone that costs the public at least $2 per ton to produce, is putting farmers in a privileged class. Moreover, local commercial producers of limestone are compelled through federal income and other taxes to pay a share of the difference between 35c and $2 per ton in the cost of producing this commodity, for the exclusive benefit of this privileged class, and at the same time are deprived of the legitimate use of their own productive facilities by this most unfair, inequitable and probably illegal competition.

The other method of attacking the problem is to make this kind of government competition *unpopular*. Politicians are quick to sense unpopularity and it is the one thing above all others they try to avoid. To combat local government competition in an industry where it has become so widespread as in the sand and gravel industry, and where so much propaganda in support of it has already taken root, is going to be no easy task; but it can be done if producers have the will, the patience and the persistence.

The columns of nearly all newspapers (we know of no exceptions) are always open to pertinent communications from responsible people. Whenever anything is published relative to alleged savings in the production of local government-operated plants, some one or more local producers, or one of their employes, should ascertain the real facts, which are easy to obtain, and present them in the form of a *temperate*, informative letter to the editor of his local newspaper, or newspapers. He should do it in a spirit of helping both the readers and the local officials to understand the real facts, not with a burst of indignation over the unfairness of it all to him. People are not ordinarily interested in whether someone else is treated fairly or not, but they are always vitally interested in knowing where their tax money goes and how its use for FERA is transferring people, capable of helping them pay taxes, from the payrolls of private employers to the relief rolls.

No opportunity to present the real facts in regard to the way government is depriving taxpayers of the means of earning a living and consequently of paying their rightful share of the tax bills should be overlooked, no matter how small the audience or the newspaper clientele. Also, to be constructive, one should be able to suggest other ways that the FERA relief money may be spent locally to provide employment and enhance civic beauty or utility.

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	10-22-34	5	7	
Allentown P. C., pfd.[47]	10-22-34	5	7	
Alpha P. C., com.	10-19-34	13⅝	13¾	
Alpha P. C., pfd.[47]	10-22-34	100	125	
Amalgamated Phos. 6's, 1936[47]	10-22-34	100	102	
American Aggregates, com.[48]	10-17-34	1¾	3½	
American Aggregates, pfd.[48]	10-17-34	4	8	
American Aggregates, 6's 1st mtg. 3/6's, 1943 new bonds[48]	10-17-34	50	....	
American Aggregates, 6's 1943, old bonds[48]	10-17-34	50F	....	
American L. & S., 1st 7's[48]	10-17-34	92	94	
Arundel Corp., com.[48]	10-17-34	12	15	
Ashgrove L. & P. C., com.[49]	10-19-34	10	....	
Ashgrove L. & P. C., pfd.[49]	10-19-34	95	....	
Atlas P. C., com.[49]	10-19-34	10	14	
Atlas P. C., 8% cum. pfd.[49]	10-19-34	35	40	
Bessemer L. and C., Class A[47]	10-22-34	2	4	
Bessemer L. and C., 1st 6½'s, 1947[46]	10-17-34	27F	30	
Bessemer L. and C., cert. of dep., 1947[46]	10-16-34	30	....	
Bloomington Limestone, 6's[47]	10-22-34	10	12	
Boston S. and G., new com.[37]	10-17-34	1	2	
Boston S. and G., new 7% pfd.[37]	10-17-34	5	10	
Boston S. and G., 7's, 1939[37]	10-17-34	60	....	
Calaveras Cement, com.[40]	10-18-34	¾	1½	
Calaveras Cement, 7% pfd.[40]	10-18-34	30	35	
California Art Tile, A[40]	10-18-34	1	2	
California Art Tile, B[40]	10-18-34	....	¾	
Canada Cement, com.[42]	10-22-34	7¾	8	
Canada Cement, pfd.[42]	10-22-34	47	....	
Canada Cement, 5½'s, 1947[42]	10-22-34	95½	96½	
Canada Crushed Stone, bonds[42]	10-22-34	76	nominal	
Canada Crushed Stone, com.[42]	10-22-34	10	nominal	
Certainteed Products, com.	10-15-34	4¾	4¾	
Certainteed Products, pfd.	10-15-34	20	25	
Certainteed Products, 5½'s, 1948	10-15-34	58¾	78¾	
Consol. Cement, 1st 6½'s, 1941[47]	10-22-34	21	24	
Consol. Cement, pfd.[47]	10-22-34	2	3	
Consol. Oka S. and G. (Can.), 6½s[42]	10-22-34	25	30	nominal
Consol. Oka S. and G. pfd.[42]	10-22-34	....	24	
Consol. S. & G. pfd.[42]	10-22-34	....	24	
Consol. Rock Prod., com.[47]	10-22-34	1	2	
Consol. Rock Prod., pfd.[47]	10-22-34	2	3	
Consol. Rock Prod., units[47]	10-22-34	3	5	
Construction Mat., com.[47]	10-22-34	1	2	
Construction Mat., pfd.[47]	10-22-34	2	4	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[37]	10-22-34	28	31	
Coosa P. C., 1st 6's[47]	10-22-34	15	20	
Coplay Cement Mfg., pfd.[47]	10-22-34	7	9	
Coplay Cement Mfg., 6's, 1941[47]	10-22-34	55	60	
Dewey P. C., com.[47]	10-22-34	85	95	
Dolese and Shepard[40]	10-19-34	8½	11	
Dufferin Pav. and Cr. Stone, com.[42]	10-22-34	....	4½	
Dufferin Pav. and Cr. Stone, pfd.[42]	10-22-34	21	23	
Federal P. C., 6½'s, 1941[47]	10-22-34	32	35	
Fla. Port. Cement, 6½'s, '37[46]	10-16-34	82½	84	
Florida Port. Cement units[47]	10-22-34	8	10	
Florida P. C., 7% cum. pfd.[40]	10-19-34	5¾	7	
Giant P. C., com.[47]	10-22-34	2	4	
Giant P. C., pfd.[47]	10-22-34	10	12	
Gyp. Lime & Alabastine, Ltd.	10-19-34	5	actual sale	
Gyp. Lime & Alabastine 5½'s, 1948	10-13-34	78	80½	
Hawkeye P. C., cap.[49]	10-19-34	28	....	
Hercules Cement, com.[49]	10-19-24	16	....	
Hercules Cement, 7% pfd.[49]	10-19-34	70	....	
Hermitage Cement, com.[47]	10-22-34	6	10	
Hermitage Cement, pfd.[47]	10-22-34	35	45	
Ideal Cement 5's, 1943[47]	10-22-34	100	102	
Ideal Cement, com.[47]	10-25-34	36	38	
Indiana Limestone 6's[47]	10-22-34	6	10	
International Cem. bonds, 5's, 1948	10-15-34	93	93	
International Cement, com.	10-15-34	21⅝	actual sale	
Kelley Island L. and T.	10-23-34	9	10	
Ky. Cons. Stone, 6½'s, 1938[47]	10-25-34	10	12	
Ky. Cons. Stone, com.[47]	10-22-34	1	2	
Ky. Cons. Stone, pfd.[47]	10-22-34	2	3	
Ky. Cons. Stone, 7% pfd.[47]	10-22-34	3	5	
Ky. Cons. Stone, 1st Mtg. 6½'s[46]	10-16-34	7½	....	
Ky. Rock Asphalt, com.[46]	10-16-34	¾	1½	
Ky. Rock Asphalt, pfd.[46]	10-16-34	6	8	
Ky. Rock Asphalt 6½'s, 1935.	7-23-34	....	55	
Kentucky Stone, com.[47]	10-22-34	....	½	
Kentucky Stone, pfd.[47]	10-22-34	....	4	
Lawrence P. C.[47]	10-25-34	9	10½	
Lawrence P. C., 5½'s, 1942[47]	10-22-34	67	70	
Lehigh P. C., com.	10-19-34	13⅞	14	
Lehigh P. C., 7% pfd.	10-18-34	....	75¼	
Louisville Cement[47]	10-22-34	75	80	
Lyman-Richey 1st 6's, 1935[47]	10-22-34	98	100	
Marbelite Corp., com. (cement pts.)[40]	10-18-34	¼	....	
Marbelite Corp., pfd.[40]	10-18-34	½	....	
Marblehead Lime 6's, 1939	7-21-34	27	32	
Marquette Cement, com.[47]	10-22-34	15	18	
Marquette Cement, pfd.[47]	10-22-34	78	82	
Marquette Cem. Mfg. 1st 5's, 1936[47]	10-22-34	90	95	
Marquette Cem. Mfg. 1st 6's, 1935[46]	10-16-34	96¼	....	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Material Service Corp.[47]	10-22-34	3	5	
McCrady-Rodgers, com.[47]	10-22-34	5	7	
McCrady-Rodgers, 7% pfd.[47]	10-22-34	15	20	
Medusa P. C., com.[47]	10-22-34	7	9	
Medusa P. C., pfd.[47]	10-22-34	25	35	
Michigan L. and C., com.[47]	10-22-34	60	65	
Missouri P. C.[49]	9- 1-34	6	8	
Monarch Cement, com.[47]	10-22-34	80	90	
Monolith P. C., com.[9]	10-25-34	2	3	
Monolith P. C., 8% pfd.	10-18-34	3	5½	
Monolith P. C., units[47]	10-22-34	10	15	
Monolith P. C., 1st Mtg. 6's[9]	10-25-34	87½	90	
Monolith Portland, Midwest[9]	10-25-34	60c	65c	
National Cem. (Can.) 1st 7's[42]	10-22-34	70	80	nominal
National Gypsum A., com.	10-20-34	8	actual sale	
National Gypsum, pfd.[47]	10-25-34	86	90	
National Gypsum 6's[47]	10-22-34	97	100	
National L. and S. 6½'s, 1941[47]	10-22-34	87	92	
Nazareth Cement, com.[47]	10-22-34	5	7	
Nazareth Cement, pfd.[47]	10-22-34	30	35	
Newaygo P. C., 7% cum. pfd.[49]	10-19-34	18	....	
Newaygo P. C., 1st 6½'s '36[46]	10-16-34	63	68	
New England Lime 6's, 1935[34]	10-16-34	8	11	
N. Y. Trap Rock 1st 6's, 1946.	10-20-34	49	49	
N. Y. Trap Rock, 7% pfd.[48]	10-17-34	56	....	
North Amer. Cement, 1st 6½'s[47]	10-22-34	35	40	
North Amer. Cement, com.[47]	10-22-24	¼	¾	
North Amer. Cement, 7% pfd.[47]	10-22-34	1	2	
North Shore Mat. 1st 6's[47]	10-22-34	25	35	
Northwestern Port. Cem., units[49]	10-19-34	15½	18	50c, Oct. 1, '34
Northwestern States P. C.[49]	10-19-34	35	40	
Ohio River S. and G., com.	10-24-34	....	5	
Ohio River S. and G., 1st pfd.	10-24-34	35	....	
Ohio River S. and G., 2nd pfd.	10-24-34	5	10	
Ohio River S. and G., 6's[46]	10-16-34	6	8	
Oregon P. C., com.[47]	10-22-34	5	10	
Oregon P. C., pfd.[47]	10-22-34	40	50	
Pacific Coast Aggr., com.[40]	10-18-34	....	10c	
Pacific Coast Aggr., pfd.[40]	10-18-34	....	15c	
Pacific Coast Aggr., 6½'s, '44[40]	10-18-34	15½F	16½F	
Pacific Coast Aggr., 7's, 1939[40]	10-18-34	2F	4F	
Pacific Coast Cement, 6's, 1937[40]	10-18-34	40	42	
Pacific P. C., com.[40]	10-18-34	2½	3¼	
Pacific P. C., pfd.[40]	10-18-34	33	35	
Pacific P. C. 6's, 1935[40]	9-17-34	90	101	
Pacific P. C. 6½'s, 1934-37[40]	10-18-34	100	101	
Peerless Cement, com.[47]	10-22-34	¼	½	
Peerless Cement, pfd.[47]	10-22-34	1	2	
Penn.-Dixie Cement, com.	10-15-34	3⅛	3⅝	
Penn.-Dixie Cement, pfd.	10-15-34	14	17	
Penn.-Dixie Cement, 6's A, 1941	10-20-34	65	65	
Penn. Glass Sand Corp., pfd.[47]	10-22-34	84	87	
Penn. Glass Sand Corp., 6's[47]	10-22-34	100	102	
Petoskey P. C., 6's, 1941[48]	10-17-34	72	....	
Petoskey P. C., 6's, 1935-1938[48]	10-17-34	72	....	
Petoskey P. C., com.[48]	10-17-34	1	2	
Republic P. C., 6's, 1943[47]	10-22-34	82	86	
Riverside Cement, A[9]	10-25-34	5	7½	22½c qu. Nov. 1††
Riverside Cement, B[9]	10-25-34	¾	1	
Riverside Cement, pfd.[9]	10-25-34	80	84	1.50 qu. Nov. 1
Rockland and Rockport Lime, 1st pfd.[47]	10-22-34	2	3	
Sandusky Cement 6's[47]	10-22-34	65	70	
Sandusky Cement 6½'s, 1932-37[47]	10-22-34	65	70	
Santa Cruz P. C., com.[9]	10-25-34	50	55	
Schumacher Wallboard, com.[47]	10-22-34	1	2½	
Schumacher Wallboard, pfd.[9]	10-25-34	1½	3	
Signal Mt. P. C., com.[47]	10-22-34	2	3	
Signal Mt. P. C., pfd.[47]	10-22-34	18	20	
Signal Mt. P. C., 6's, 1936[47]	10-22-34	95	100	
Southwestern P. C., units[40]	10-18-34	150	....	
Spokane P. C., 7% cum. pfd.[49]	9- 1-34	8	....	
Standard Paving & Mat. (Can.) com.[42]	10-22-34	95c	1	
Standard Paving & Mat. pfd.[42]	10-22-34	....	15	
Superior P. C., A[40]	10-18-34	24¾	26¾	55c (2 mos.) Nov. 1†
Superior P. C., B[40]	10-18-34	5	7	
Trinity P. C., units[47]	10-22-34	22	25	
Trinity P. C., com.[47]	10-22-34	2	5	
Trinity P. C., pfd.[47]	10-22-34	20	25	
U. S. Gypsum, com.	10-15-34	39	40¾	
U. S. Gypsum, pfd.	10-15-34	....	136	
Volunteer P. C., 1st 7's, 1942[49]	10-19-34	68	....	
Volunteer P. C., com.[49]	10-19-34	2	....	
Volunteer P. C. units[49]	10-19-34	....	62	
Vulcanite P. C., cap.[49]	10-19-34	1	5	
Vulcanite 7½'s 1943[49]	10-19-34	34	....	
Wabash P. C.[47]	10-22-34	6	8	
Warner Co., ww., 1st 6's[47]	10-22-34	30	35	
Warner Co., ex.w. 1st 6's[47]	10-22-34	25	30	
Warner Co. com. (sold at auction, Philadelphia)	3- 7-34	2½	actual sale	
Warner Co. pfd. (sold at auction, Philadelphia)	3- 7-34	7½	actual sale	
Whitehall Cem. Mfg., com.[47]	10-22-34	30	35	
Whitehall Cem. Mfg., pfd.[47]	10-22-34	50	50	
Wisconsin L. & C., 1st 6's, 1940[47]	10-22-34	30	40	
Wolverine P. C., com.[47]	10-22-34	1	2	
Yosemite P. C., A., com[46]	10-16-34	1½	2¼	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [14]Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [27]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

F—Flat. †The payment is on arrears and leaves accumulated unpaid dividends of $1.92½ a share. ††This leaves arrearage of $3.75 a share.

Recent Dividends Announced

Coronet Phosphate Co., com. (quarterly) (This is double the amount paid in recent quarters.)	$2.00	October 1, 1934
Idaho Portland Cement Co. pfd. (semi-annual) (This reduces arrearage to $10.50.)	3.50	October 15, 1934
Northwestern States P. C. Co.	.50	October 1, 1934
Riverside Cement Co., Class A (accum. quarterly)	.22½	Nov'ber 1, 1934
Riverside Cement Co., pfd. (quarterly)	1.50	November 1, 1934
Superior Portland Cement Co., Class A (accum. 2 mos.)	.55	November 1, 1934

Alpha Portland Cement Co., Easton, Penn, reports for the 12 months ended September 30, a net loss of $259,776 after taxes, depreciation, minority interest, etc., comparing with net loss of $971,485 for the 12 months ended September 30, 1933. Current assets as of September 30, 1934, including $6,153,811 cash and marketable securities, amounted to $8,297,528 and current liabilities were $226,799. This compares with cash and marketable securities of $5,861,813, current assets of $8,087,335 and current liabilities of $238,546 on September 30, a year ago.

Consolidated income account for 12 months ended September 30, 1934, compares as follows:

	1934	1933
Net sales	$4,583,014	$3,960,870
Operating expenses	3,562,458	3,592,176
Depreciation	1,431,476	1,415,088
Operating loss	$ 410,920	$1,046,394
Other incumbrances (net)	139,180	65,454
Loss	$ 271,740	$ 980,940
Federal tax	.....	.....
Minority interest	*11,964	*9,455
Net loss	$ 259,776	$ 971,485
Preferred dividends	140,000	140,000
Common dividends	.....	.....
Deficit	$ 399,776	$1,111,485

*Credit.

Consolidated balance sheet of Alpha Portland Cement Co. as of September 30, 1934, compares as follows:

ASSETS.

	1934	1933
*Property account	$16,862,972	$17,803,915
Cash	2,585,487	2,010,864
U. S. Government securities	3,568,325	3,850,949
Working funds, advertising, etc.	164,546	132,090
Accounts and notes receivable	462,789	749,927
Inventories	1,516,382	1,343,505
Treasury stock, at cost	‡703,482	420,720
Miscellaneous investment at cost	35,073	20,192
Deferred items	115,036	98,323
Total	$26,014,092	$26,430,485

LIABILITIES

7% preferred stock	$ 2,000,000	$ 2,000,000
†Common stock	18,486,000	18,486,000
Accounts payable	165,395	171,550
Accrued taxes	61,404	66,996
Reserves	669,519	664,870
Minority interest	56,795	68,759
Surplus	4,574,979	4,972,310
Total	$26,014,092	$26,430,485

*After depreciation and depletion. †Represented by 711,000 no-par shares. ‡Consists of 64,500 common shares.

At the special meeting of the common stockholders of the company held on October 16, 1934, there were present in person or by proxy 528,681 shares of the common stock out of 646,500 shares in the hands of the public, all of which were voted in favor of the redemption of the preferred capital stock of the company, in accordance with the terms of the company's charter, viz.: $125 per share, plus accumulated dividends to the date of redemption, which has been set as of February 1, 1935, after which date dividends on the preferred stock will cease to accrue.

◆ ◆ ◆

Pennsylvania-Dixie Cement Corp., New York City, and subsidiaries reports for the 12 months ended September 30, a profit of $978,425 before depreciation, depletion and interest, comparing with profit of $315,935 for the 12 months ended September 30, 1933. After provision for depreciation, depletion and interest there was a net loss of $950,900 against net loss of $1,642,227 in preceding 12 months. Current assets as of September 30, last, amounted to $4,821,348 and current liabilities were $333,195 against current assets of $4,700,644 and current liabilities of $197,801 on September 30, last year. Consolidated income account for 12 months ended September 30, 1934, compares as follows:

	1934	1933
Operating profit	$ 978,425	$ 315,935
Depreciation and depletion	1,360,848	1,379,578
Loss	$ 382,423	$1,063,643
Interest	568,477	578,584
Federal tax	.....	.....
Net loss	$ 950,900	$1,642,227

◆ ◆ ◆

Ideal Cement Co., Denver, Colo., stockholders have voted to retire immediately $1,259,700 in 5% debenture bonds previously acquired and to call by lot on January 1, 1935, an additional $1,500,000 of bonds at 102 and interest. The bonds are due 1943. This latest action on the part of the company means that of the $8,500,000 of debentures originally issued, $7,113,700 will have been called and retired by January 1, 1935, leaving only $1,386,300 outstanding in the hands of the public at that time.

◆ ◆ ◆

International Cement Corp., New York City, reports for the quarter ended September 30 consolidated income account as follows:

	1934	1933
Gross sales	$4,392,639	$3,823,161
Expenses, depreciation, etc.	3,824,388	3,446,913
Operating profit	$ 568,251	$ 376,248
Interest, etc.	197,582	220,957
Federal taxes and contingencies	185,078	125,055
Net profit	$ 185,591	$ 30,236

For the nine months ended September 30:

	1934	1933
Gross sales	$12,271,809	$9,766,720
Expenses, depreciation, etc.	10,611,365	8,953,993
Operating profit	$ 1,660,444	$ 812,727
Interest, etc.	640,731	700,609
Federal taxes and contingencies	487,149	335,039
Net profit	$ 532,564	*$ 222,921

*Loss.

Consolidated Rock Products Co., Los Angeles, Calif., for the year ended December 31, 1933, reports consolidated earnings as follows:

Sales, net after discounts and allowances	$1,818,180
Cost of sales, selling and administrative expenses	1,601,088
Operating profit	$ 217,092
Other income	13,218
Net income	$ 230,309
Deduct interest expense on outstanding bonds of subsidiaries	186,370
Provision for depreciation and depletion	425,570
Amortization of bond discount and expense	17,035
Net loss for the year	$ 398,666

CONDENSED BALANCE SHEET
(as of December 31, 1933)

Assets—	
Cash in banks and on hand	$ 200,941
d Accounts and notes receivable	143,598
Inventories	72,030
Prepaid items	79,992
Deposits and non-current notes receivable	2,085
Int. in net worth of contr. co.	39,726
a Properties	3,409,839
Deposits held on lease	1
b Note rec. and accr. int. uncoll.	45,183
c Note rec. of co. in receiv's'p.	33,539
Other assets	224,247
Total	$4,251,181
Liabilities—	
Accts. payable and accru. items	$ 192,277
Notes and contracts payable in 1934	33,744
Notes and contracts payable after 1934	30,500
Prov. for contingencies, &c.	55,000
Funded debt	3,103,000
e Preferred stock	1,800,000
f Common stock	1
Operating deficit	963,341
Total	$4,251,181

a After depreciation and depletion. b Secured by trust deed to real estate. c Secured by chattel mortgage on rock industry equipment. d After provision for bad debts, discounts and allowances. e Represented by 285,947 shares (no par). f Represented by 397,455 shares (no par).

◆ ◆ ◆

Lehigh Portland Cement Co., Allentown, Penn., reports for 12 months ended September 30, 1934, net profit of $495,853 after taxes, depreciation, depletion and obsolescence, equal to $3.14 a share on 157,817 shares (par $100) of 7% preferred stock. This compares with net loss of $1,254,889 for the 12 months ended September 30, 1933.

Recent Prices Bid and Contracts Awarded

Knoxville, Tenn.: Tennessee Valley Authority announces contracts for 1,500,000 bbl. of cement at $1.87 per bbl. for the Wheeler dam and $1.73 per bbl. for the Norris dam, have been awarded. Except 87,000 bbl. awarded to Lehigh Cement Co. and 75,000 bbl. awarded to Universal-Atlas Cement Co., all contracts went to Southern mills.

◆ ◆ ◆

Basking Ridge, N. J.: Morris County Crushed Stone Co., Morristown, N. J., awarded township contract for 1,500 tons of 1½-in. trap rock and 170 tons of dustless screenings at $2,973.50, or approximately $1.72 per ton.

◆ ◆ ◆

Effingham, Ill.: Low bidder on 300 cu. yd. of gravel for county roads, Lake Bros., Dieterich, Ill., at $1.85 per ton.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of October 20:

New England

34061. To amend Items 1120, 1175, 1180, 1185, 1190 and 1225 of B. & M. R. R., I. C. C. A-2833, which provide mileage commodity rates between stations on the B. & M. R. R., on **ashes, cinders, gravel, crushed or broken stone, sand and loam,** by changing the minimum weight as follows: 80,000 lb., except when car is loaded to cubical or visible capacity, actual weight will apply. Reason: To provide minimum weight on heavy bulk commodities which will assist the carrier in furnishing equipment for the handling of this traffic.

34134. To cancel commodity rates on **lime, mortar, lime ashes, and limestone,** from various Rutland R. R. stations to points in N. E. and T. L. territories, as named in Rutland R. R. I. C. C. 5803, 6183, 6223, 6224, 6233, 6247, 6293, 6378, 6381 and 6370. Reason —Obsolete.

Trunk

32878. **Crushed stone,** coated with oil, tar or asphaltum, C. L., (See Note 2), from Bethlehem, Penn., to Lawrenceville, Westfield, Mills, Middlebury, Wellsboro Jct., Ansonia, Slate Run, Jersey Shore, Newberry Jct., Mill Hall, Penn., and various, rates ranging from $1.50 to $2.10 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity as shipped.

32883. **Talc tailings,** C. L.; **soapstone,** ground or pulverized, other than soapstone (testing not less than 99% through 20-mesh screen), C. L.; **soapstone,** crude, not ground or pulverized (not blocks or slabs), C. L., minimum weight 70,000 lb., from Schuyler, Va., to Camden, N. J., 18c per 100 lb. Present rate 27c per 100 lb., sixth class. Reason—Proposed rate is comparable with rates from and to points in the same general territory.

32894. **Cement, common, hydraulic, natural or portland,** C. L., also **cement mixture** (consisting of cement and common sand), in boxes, in mix carloads with shipments of cement, minimum weight in bulk 50,000 lb., other than in bulk 50,000 lb., except when for carrier's convenience, cars of less capacity are furnished, in which case minimum weight will be marked capacity of the car furnished, but in no case less than 40,000 lb., from Martinsburg, W. Va., to Linden, Forest Glen, Kensington, Garrett Park and Halpine, Md., 9½c per 100 lb. Present rate, 10½c per 100 lb. Reason—Proposed rate is comparable with rate to Georgetown Jct., Md.

32896. To cancel the commodity rates on **crushed stone** as published in B. & O. R. R., I. C. C. 22183, from Berkeley Springs, W. Va., permitting class rates to apply in the future. Reason: Investigation develops no traffic has moved for some time and no prospect of future movement, therefore, rates are obsolete.

32898. **Cement,** common, hydraulic, natural or portland, carload, in bulk only, minimum weight 100,000 lb., from Manheim, W. Va., to Colona, Penn., 9½c per 100 lb., applicable only as proportional rate on traffic destined beyond by water to points on the Ohio River and its tributaries. Present rate 12c per 100 lb.

32905. **Sand and gravel** (except blast, engine, foundry, glass, molding or silica), C. L. (See Note 2), from Cuddebackville, N. Y., to Hunter, N. Y., $1.65 per net ton. Present rate, 16c per 100 lb., sixth class. Reason—Proposed rate is fairly comparable with rates from Haven, N. Y., to Big Indian and Pine Hill, N. Y.

32914. **Sand,** C. L. (See Note 2), from Jersey City, N. J., to Elizabethport, N. J., 81c per net ton. Present rate, 92c per net ton. Reason—Proposed rate is comparable with rate from Jersey City to Port Newark, N. J.

Bulletin 916. It is proposed to revise all rates on **limestone,** ground or pulverized, C. L., minimum weight 60,000 lb., from actual producing points in Trunk Line territory to points in Trunk Line territory including destinations in the states of West Virginia, Pennsylvania and New York. From districts where grouping will be applied, it is proposed to apply the same grouping that is now being used in the proposed general revision of lime rates within Trunk Line territory. Where movement is from a single producing point, rates will be predicated on distances from the rate basing point to be the class rate destination base point as used in the Eastern Class Rate Case, I. C. C. Docket 15879. To points involving car float or lighterage service in the New York Harbor district, such rates will be subject to an additional charge of 70c a ton over the New Jersey rail head rate. To destinations on the Long Island Railroad Group A rates will be the same as rate to New York Harbor points, Group B will be made 25c over Group A, to Group C 40c over Group A, and Group D 70c over Group A. The following scale will be applied from Trunk Line origins, except from the following stations on the Delaware & Hudson Company: Howes Cave, N. Y., West Rutland, Vt., and Chazy, N. Y.:

Miles	Proposed scale for single and joint line application
5	60
10	60
15	65
20	70
25	75
30	80
35	85
40	100
45	110
50	110
55	115
60	115
65	120
70	125
75	130
80	130
85	135
90	135
95	140
100	140
110	150
120	150
130	160
140	160
150	165
160	170
170	175
180	175
190	185
200	185
210	195
220	195
225	195
230	195
240	205
250	205
260	205
275	215
280	215
300	225
320	235
325	235
340	235
350	245
360	245
375	255
380	255
400	265
420	275
425	275
440	275
450	285
460	285
475	295
480	295
500	305

From Howes Cave, N. Y., West Rutland, Vt., and Chazy, N. Y., it is proposed to revise such rates by using short line mileages from each origin point to the base point in the destination class rate group and apply the limestone scale as prescribed by the Interstate Commerce Commission in I. C. C. Docket 25220, reproduced below:

Distance Miles	Rate per net ton* Single line cents	Joint line cents
5	60	80
10	65	85
15	70	90
20	75	95
25	80	100
30	85	105
40	90	110
50	100	120
60	105	125
70	115	130
80	120	135
90	130	145
100	135	150
120	145	155
140	155	165
160	165	170
180	175	175
200	185	185
225	195	195
250	205	205
275	215	215
300	225	225
325	235	235
350	245	245
375	255	255
400	265	265
425	275	275
450	285	285
475	295	295
500	305	305

*Subject to a minimum of 60,000 lb.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Central

40968. To establish on **stone,** crushed, coated with oil, tar and/or asphaltum, in open top equipment, carloads (see note), from Annandale, Penn., to destinations in Pennsylvania, New York, Ohio and West Virginia, embracing same territory to which rates are published on crushed stone and screenings. Rates in cents per net ton:

Distance, Miles	Single-line, Cents	Joint-line, Cents
20	73	88
40	83	98
60	93	108
80	103	118
100	113	128
125	123	137
150	133	148
175	143	155
200	153	154
225	161	171
250	168	177

Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity as shipped, the shipper to so certify on the shipping orders and bills of lading.

The single line scale will be employed where distances are made over a single line and the joint line scale when distances are made over two or more lines, except the single line scale for route distances will be used in connection with joint hauls with the Erie R. R., Montour R. R., New York Central R. R., New York, Chicago & St. Louis R. R. and Pittsburgh and Lake Erie R. R. when resulting in lower rates than by use of joint line scale for short line distances. Present, class rate basis.

41142. To establish on **crushed stone,** C. L., from Greenfield, O., to points in West Virginia, Kentucky and Virginia, rates as shown in Exhibit A. Present, class rates (sixth class).

EXHIBIT A

From Greenfield, O.

(Rates in cents per 2000 lb.)

To representative points N. & W. Stations	Prop. rates
East Lynn, W. Va.	150
Wayne, W. Va.	140
Ragland, W. Va.	170
Dilbarton, W. Va.	160
Neal, W. Va.	140
Crum, W. Va.	150
Beauty, Ky.	160
Gray Eagle, W. Va.	160
McVeigh, Ky.	170
Leckieville, Ky.	160
Williamson, W. Va.	160
Cinderella, W. Va.	170
Matewan, W. Va.	170
Nampa, Ky.	170
Colonel, W. Va.	170
Grundy, Va.	170
Home Creek, Va.	180
Woodman, Ky.	170
Light, W. Va.	180
Brit, W. Va.	200

Berwind, W. Va.	190
Gavin, W. Va.	200
Rift, W. Va.	190
Carlos, W. Va.	180
Twin Branch, W. Va.	190
Jenkin Jones, W. Va.	200
O'Toole, W. Va.	190
Vivian, W. Va.	190
Cooper, W. Va.	200
Wyanoke, W. Va.	200
Montcalm, W. Va.	200
Boissevaine, Va.	200
Bluestone, W. Va.	200
Italy, Va.	200
Norton, Va.	220
Toms Creek, Va.	220
Vicco, Va.	210
Finney, Va.	200
Goza, Va.	210
Gardner, Va.	200
Bluefield, Va.	200
Bluefield, W. Va.	200

41143. To revise rate on **slag,** commercial (a product of iron and steel blast or open hearth furnaces), in open top cars, C. L., minimum weight 80% of marked capacity of car, from Massillon, O., to Botzum, O. Proposed, 60c per net ton; present, 50c per net ton.

41147. To establish on **sand and gravel** and **sand,** blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, C. L., from Jackson, O., to Flint, Mich., rate of 200c per net ton. Present, 252c per net ton.

41148. To establish proportional rates on **rock,** bituminous asphalt, crude, crushed or ground, C. L., from East St. Louis, Ill., to points in C. F. A. territory, rates as shown in Exhibit B. Present, sixth class as shown in Exhibit B.

EXHIBIT B

From East St. Louis, Ill.

(Rates in cents per net ton)

To representative points	Prop. rates	*Pres. rates
Alvordton, Ohio	330	540
Lima, Ohio	320	520
Greenville, Ohio	310	500
Dayton, Ohio	310	520
Cincinnati, Ohio	310	500
Springfield, Ohio	320	520
Washington C. H., Ohio	330	540
Columbus, Ohio	330	560
Bellefontaine, Ohio	330	540
Delaware, Ohio	340	580
Toledo, Ohio	340	580
Sandusky, Ohio	350	600
Mansfield, Ohio	340	580
Mt. Vernon, Ohio	350	600
Newark, Ohio	340	580
Athens, Ohio	360	620
Zanesville, Ohio	350	600
Coshocton, Ohio	360	620
Marietta, Ohio	370	640
Parkersburg, W. Va.	370	640
Maysville, Ky.	360	620
Huntington, W. Va.	350	600
Charleston, W. Va.	370	640
Dover, Ohio	370	640
Alliance, Ohio	370	640
Cleveland, Ohio	370	640
Lorain, Ohio	360	620
Ashtabula, Ohio	380	660
Youngstown, Ohio	380	660
Erie, Penn.	400	680
Corry, Penn.	420	720
Buffalo, N. Y.	440	740
Pittsburgh, Penn.	400	680
Pomeroy, Ohio	360	620
Steubenville, Ohio	380	660
New Philadelphia, Ohio	370	640

*Sixth class.

41179 (2). To establish on **stone,** viz., rubble, C. L., from McDermott, O., to Binghamton and Utica, N. Y., rate of 24c. Routes—Via routing guide routes. Present—33c (6th class).

41181 (2). To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) and gravel, C. L., from Toledo, O., to Batavia, O., rate of 155c per net ton. Present—21c.

41190 (2). To establish on **crushed stone and agricultural limestone** (unburned), carload, in open top cars, from Lewisburg, O.

To (Representative Points)	(1)	(2)	(3)
Piqua, O.	12	5½	80
Troy, O.	12	5½	80
Tippecanoe City, O.	12	5½	80
Dayton, O.	11	5½	75
Whitfield, O.	11	5½	75
Poast Town, O.	11	5½	70
Trenton, O.	12	5½	75
Busenbark, O.	12	5½	80
Hamilton, O.	12	5½	80
Stockton, O.	13	6½	85
College Corner, O.	13	6½	90

(1) Sixth class, on crushed stone, on agricultural limestone, equivalent table; crushed stone, being present rates.

(2) Sixth class, on crushed stone, on agricultural limestone, equivalent table; agricultural limestone, being present rates.

(3) In cents per net ton, being proposed rates.

41204. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel,** in open top cars, C. L., from Stanhope, O., to Hubbard, O., rate of 60c, and to Sharon, Penn., rate of 70c per net ton. Present rate—200c per net ton (sixth class).

41205. To cancel the following C. L. commodity rates from G. T. Ry. L. W. Tariff 312-O, on (a) **gravel,** C. L., from Grand Haven, Mich., to Buffalo, Black Rock and Suspension bridge, N. Y., 16c, published in Items 520-A and 525-A, Sup. 18, to above referred to tariff, and (b) **dust,** granite (refuse sand), C. L., from Grand Rapids, Mich. Rates in cents per net ton.

To	Rate
Belle Vernon, Penn.	340
Bessemer, Penn.	340
Blairsville, Penn.	380
Connellsville, Penn.	380
Crabtree, Penn.	380
Elizabeth, Penn.	340
Fairmont, W. Va.	380
Indiana, Penn.	400
Johnstown, Penn.	400
Kittanning, Penn.	340
Leckrone, Penn.	380
Oil City, Penn.	340
Pittsburgh, Penn.	340

—published in Items 74 to 74½, inclusive, Sup. 18 to above mentioned tariff.

41227. To establish on **limestone, agricultural,** in box cars, carload, minimum weight 50,000 lb., from Gibsonburg and Woodville, O., to points in Indiana, rates as shown in Exhibit A attached. Present rates as shown in Exhibit A.

EXHIBIT A

(Rates in cents per net ton.)

To (Representative Points)	Pres.	Prop.	Route
Alexandria, Ind.	220	200	5–7
Attica, Ind.	260	230	10
Colfax, Ind.	230	230	1–13
Converse, Ind.	220	220	6–13
Crawfordsville, Ind.	260	230	1–8–13
Delphi, Ind.	230	230	8–10
Fairmont, Ind.	220	200	7
Handy, Ind.	280	240	5–12
Hartford City, Ind.	220	200	4–13
Kokomo, Ind.	240	230	5–9–13
Linden, Ind.	260	230	8–9
Logansport, Ind.	230	220	10–13
Muncie, Ind.	220	200	1–4–5–6
Noblesville, Ind.	240	230	5–14
Peru, Ind.	230	200	10
Red Key, Ind.	230	200	5–13
Sheff, Ind.	280	240	1–12
Swanington, Ind.	280	240	1–11
Swayzee, Ind.	220	220	9
Templeton, Ind.	260	240	1–5
Veedersburg, Ind.	280	240	1–9–11
Wabash, Ind.	230	200	7–10
Westfield, Ind.	240	230	8–14

41228. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass grinding or polishing, loam, moulding and silica), and **gravel,** carload, from South Lebanon, O., rates in cents per net ton:

To	*Prop.	Pres.
Augusta, Ky.	110	130
Ausanba, Ky.	120	140
Bradford, Ky.	110	125
Broshears, Ky.	120	135
California, Ky.	100	120
Carntown, Ky.	100	125
Dam No. 35, Ky.	100	120
Dover, Ky.	120	135
Foster, Ky.	110	125
Ivor, Ky.	100	125
Maysville, Ky.	120	140
Mentor, Ky.	100	120
New Richmond, Ky.	100	120
Oneonta, Ky.	100	120
South Ripley, Ky.	120	135
Wellsburg, Ky.	110	130
Willow Grove, Ky.	110	125

*I. C. C. 15329 scale.

Route: Via P. R. R., Cincinnati, O., C. & O. Ry.

41158. To cancel rates on **lime,** common, hydrated, quick or slaked and lime, agricultural and fluxing, carload, minimum weight 50,000 lb., published in agency and/or individual lines tariffs, from Marion, Ohio, for account of the Erie R. R., C. & O. and C. C. C. & St. L. Ry., and Owens, O., to points in C. F. A. territory, also points east of the western termini of eastern trunk lines, also points in the northwest, account obsolete.

Southern

6412. **Phosphate rock,** Tennessee mines to Carolina territory. It is proposed to apply same rates on phosphate rock from Tennessee mines to North Carolina via A. C. L. R. R. as are applicable via other lines, holding the North Carolina rates as maxima at points in South Carolina.

6500. **Asphaltic limestone,** C. L., Margerum, Ala., to points in the state of Missouri and to points in W. T. L. territory. Lowest combination rates are now applicable. It is proposed to establish rates on asphaltic limestone, C. L., from Margerum, Ala., to points in the state of Missouri north of the St. L.–S. F. Ry., St. Louis, Mo., to Kansas City, Mo., not including St. Louis, Mo., also to points in W. T. L. territory, except points in the states of Kansas and Missouri on and south of the St. L.–S. F. Ry., St. Louis to Kansas City, Mo., based on a mileage scale of rates.

6501. **Stone, viz., limestone or marble,** ground or pulverized, C. L., Tate, Ga., to Tamms, Ill. Combination now applies. Proposed rate on stone, viz., limestone or marble, ground or pulverized to fineness to pass through a screen of 200 mesh to the inch, in bulk, or in bulk in bags or barrels, C. L., minimum weight 60,000 lb., from and to above named points, 360c per net ton, same as rate formerly in effect.

Southwestern

3979. **Keene's cement, Keene's filler and wall plaster,** from El Dorado and Southard, Okla., to Newark, N. J., and New Brighton, N. Y. To establish a rate of 32½c per 100 lb. on Keene's cement and/or Keene's filler, straight or mixed carloads, or Keene's cement and wall plaster, in mixed carloads, minimum weight 60,000 lb., from El Dorado and Southard, Okla., to Newark, N. J., and New Brighton, N. Y.

3981. **Cement,** stopover to partly unload at points in Arkansas on the C. R. I. & P. Ry. To publish additional note in Item 5-B, S. W. L. Tariff 168-D, providing that points located on the Newport, Searcy and Stuttgart branches of the C. R. I. & P. Ry. will be considered intermediate when Brinkley and/or Mesa, Ark., are considered intermediate.

3986. **Lime,** from points in Arkansas, Kansas and Missouri to Clayton, N. M. To establish rate of 36c per 100 lb. on lime, carload, minimum weight 30,000 lb., from Springfield, Mo., and group, also Johnsons, Ark., to Clayton, N. M., which is same rate as in effect to Felt, Okla.

Western

Appl. D-41-14 (Appl. Bn. 3790). **Stone,** crushed, **sand** and other commodities, from Barton, Kan., to points in Kansas. Approved docketed proposal in principle.

D-41-37. **Stone,** broken, crushed or ground, C. L. (See Note 3), but in no case shall the minimum weight be less than 40,000 lb., from Pinehill, Mich., to St. Paul, Minneapolis and Minnesota Transfer, Minn. Rates—Present, 270c per net ton of 2000 lb.; proposed, 200c per net ton of 2000 lb.

Dkt. 8540 (Dkt. Bn. 3515). **Rock,** asphalt, natural or coated; **stone,** coated, etc., from Cline, Blewett, Dabney, La Pryor, Pulliam and Whitesboro, Tex., to Fremont, Neb. Approved docketed proposal, amended to provide same rate from Dougherty, Okla., to Fremont and Lincoln, Neb.

D-11-7. **Cement,** hydraulic, portland or natural, carloads, from Mason City, Ia., to Waltham, Hayfield, Sargeant, Renova, Elkton, Taopi, Minn., Bailey, McIntire, David, Little Cedar and Osage, Ia. Rates: Present—9c per 100 lb. Proposed—8½c per 100 lb.

D-41-35. Rates and minimum weight, **limestone,** ground, carload, from Valmeyer, Ill., to stations shown below (representative points). Rates, present, class or combination rates.

To	Short Line Miles	Prop.
Cedar Rapids	315	12
Ottumwa	278	11.5
Waterloo	369	12.5
Marshalltown	361	12.5
Mason City	439	14
Ft. Dodge	443	14
Des Moines	360	12.5
Sioux City	537	16

Minimum weight present 40,000 lb. Proposed, 90% of marked capacity of car, except when actual weight of shipment loaded to full visible capacity is less actual weight will apply but in no case less than 40,000 lb.

Traffic and Transportation News

I. C. C. Decisions

26464. Sand and Gravel. Merom Gravel Co. vs. I. C. By division 4. Complainant entitled to reparation on finding unreasonable rate of 88c a ton, sand and gravel, Riverton, Ind., to Watson, Ill., to extent it exceeded 76c. Shipments moved between September 15 and 24, 1932.

21267. Cement. Signal Mountain Portland Cement Co. vs. A. G. S. et al. Rates charged, cement, between June 1, 1925, and April 14, 1928, Chattanooga, Tenn., to destinations in Florida, applicable except as to traffic over the Seaboard into and out of Jacksonville between August 20, 1926, and October 25, 1927. The inapplicability was found in the southern factors named in the basis book. The Commission said that the applicable factors were those named in a port tariff. Reparation awarded.

Texas: Truck-Forced Rates: Cement. On further hearing, in 15427, Iola Cement Mills Traffic Association et al. vs. Abilene & Southern et al., 21164, Iola Cement Mills Traffic Association et al. vs. Abilene & Southern et al., the Commission stated that it is convinced "that truck competition compels the Texas carriers to maintain intrastate rates on cement lower than the normal basis, and that the evidence fails to establish that the reduced rates assailed, or those effective July 1, 1934, are lower than those reasonably necessary to meet such competition."

The formal finding is that the occasion for the establishment of the reduced intrastate rates on cement in Texas was the existence of compelling truck competition either actual or impending; that those rates grew out of changed conditions that have arisen since the prior proceedings in these cases; and that they are not unduly prejudicial to complainants or interveners, or otherwise unlawful. The original findings, therefore, have been modified accordingly.

This further hearing was the result of an allegation by the complainants in Oklahoma Portland Cement Co. vs. D. & R. G. W., 128 I. C. C. 63, known as the Texas case, decided May 19, 1927, and Oklahoma Portland Cement Co. vs. A. T. & S. F., 163 I. C. C. 249, known as the Oklahoma case, decided April 22, 1930, that the railroads were not observing the findings made in the Texas and Oklahoma cases. The non-observance of the findings in those cases was alleged to be shown by "the voluntary establishment of rates which are lower than the Scale III and Scale IV bases on intrastate traffic within that state" (Texas). Various cement companies intervened in support of the allegation, contained in a petition for reopening, and were treated as complainants.

Complainants asserted that so far as they had been able to determine the Texas scale III and scale IV rates, which became effective December 12, 1927, were continued in effect on both interstate and intrastate traffic and strictly adhered to until early in 1929. Then exceptions began to be made on Texas intrastate traffic. Since the latter date the complainants alleged, these exceptions had grown in number and importance. Complainants averred, said the Commission, that these reduced Texas intrastate rates had brought about the alleged prejudicial situation which made necessary their petition for further hearing. The Commission was asked to require the establishment and maintenance by the railroads of nonpreferential rates on intrastate shipments of cement in Texas.

Reductions in intrastate rates were permitted by the Texas commission. About thirty of the so-called special reduced rates were instanced by complainants. Representative of the special rates was one of $14.50 a car from Atco, a suburb of Waco, to industries or locations at Waco which became effective February 11, 1929. The normal scale III rate for such a movement, the Commission said, was 8c, or $40 a car, minimum 50,000 lb., the special rate resulting in a reduction of $25.50 a car. A similar rate of $14.50 was cited as having been established on October 13, 1930, from Houston to Pierce Junction, Tex.

The Commission said that for the most part these so-called special reduced rates were made to apply within a switching district or within a single industrial or commercial community.

On February 17, 1934, the report said, the Texas carriers sought and were granted authority by the Texas commission to modify the mileage scale, the modification to become effective July 1, 1934, and to expire at midnight, March 31, 1935. That scale ranged from 4c for hauls of 20 miles and less, to 10.5c for hauls of from 70 to 75 miles.

Complainants asserted that it was their understanding that all trucking of cement from Texas mills was discontinued prior to the time that that application was filed. They inferred that the sole cause for the establishment of the reduced rates was a threat of certain Texas cement manufacturers that they would again open their plants to motor truck transportation. The complainants took the position that under the cement industry code of fair competition the cement mills could be forced to transport their products by rail rather than by truck.

After reviewing the pertinent parts of the cement code the Commission said that in view of the seller's unrestricted right, which was its own conclusion, of election as to the mode of transportation by which his shipments should be moved, the contention made by the complainants with respect to the code could be given but little weight.

With respect with the compensatory nature of the reduced truck-compelled rates, the railroads pointed out that under the normal scale the rates on cement from Chanute, Kan., to destinations in Texas, for distances ranging from 299 to 407 miles, earned from 10.07 to 11.68 mills a ton mile. The earnings under the truck-compelled rates ranged for the short distances from 25.7 to 80 mills a ton-mile, they said.

The Commission said that on cross-examination complainants' principal witness admitted that if the Texas carriers had not reduced their intrastate rates, and the Texas shippers and consumers could have had their cement trucked at a cost not exceeding, and perhaps less than the rates the rail carriers actually established, the interstate shippers would not have been placed in any better position.

25428. Cement. Beaver Portland Cement Co. et al. vs. California Central et al., by Division 3. Dismissed. Cement rate from points in California to California ports for transshipments by water to points in Oregon and Washington held unduly prejudicial or otherwise unlawful.

15230. Cement. Fourth section application by Division 2. The Fort Worth and Denver City, for itself and on behalf of the S. P. C. R. I. and P., and C. R. I. and G., authorized to establish and maintain general cement rates over their routes from El Paso, Tex., to stations in Texas on the Fort Worth and Denver City equal to the lowest that may be constructed over any line or route over like traffic from and to the same point on the basis of the distance scale rate prescribed or approved in the case of Oklahoma Portland Cement Co. vs. D. and R. G. W. (IV).

25953. Cement. By Division 3. Louisville Cement Co. vs. Pennsylvania Railroad et al. Cement rates from Speeds, Ind., to points in Arkansas, Louisiana and Missouri held unreasonable but not otherwise unlawful to the extent they exceeded scale III prescribed in the Western cement rate case. Reparation awarded.

26134. Lime. By division 3. Limestone Products Co. vs. C. and N. W. et al. Dismissed. Defendant's collection of the formerly authorized emergency charge of 1c a 100 lb. on lime from Menominee, Mich., to Wisconsin points, also contemporaneous non-collection of the charge on lime traffic from and to points in Wisconsin, found not to have resulted in violation of regulations under Interstate Commerce acts.

26039. Sand and Gravel. By Division 3. Rock Island Sand and Gravel Co. vs. Chicago, Burlington and Quincy Railroad Co. et al. Charges on sand and gravel in C. L., from Rock Island, Ill., to Davenport and Bettendorf, Ia., found unreasonable but not unduly prejudicial. Reparation awarded.

15230. Cement. Fourth Section. Conditional authority granted to establish and maintain rates on cement in C. L., from El Paso to other points in Texas on the Fort Worth and Denver City Railway, without observing fourth section provisions of the Interstate Commerce Act.

15130. Crushed Stone and Slag. Fourth Section. By Division 2. Authority granted on condition to establish and maintain rates on crushed stone in C. L., from Hillsville, Shaw Junction and Walford, Penn., and on slag, C. L., from Midland and Sharpsville, Penn., and Weirton, W. Va., to Ohio destinations without observing usual long-and-short-haul provision of Section 4.

14761. Sand, Gravel and Crushed Stone. Fourth Section. By Division 2. Upon further consideration, authority granted conditionally to establish and maintain rates on sand, gravel, crushed stone and related commodities, C. L., between Albany, Ga., and Montgomery, Ala., without observing the long-and-short-haul provision of section 4 of the Interstate Commerce Act.

15493. Limestone. Fourth section. By division 2. Carriers authorized to establish rates on agricultural limestone from Gibsonburg, Woodville, Genoa, Martin, Marblehead, Carey and Whitehouse, Ohio, to destinations in the lower Michigan peninsula in bags or in bulk in box cars, minimum weight, 60,000 lb. and in open top cars, minimum weight 90 per cent of the marked capacity of the car, the lowest applicable over any lines or routes operating from and to such points constructed on prescribed basis.

15507. Cement. Fourth section. By division 2. Parties to Boyd's I. C. C.'s Nos. A-2033 and A-2179 authorized to establish rates over circuitous routes on cement from Limedale, Mitchell and Speed's, Ind., to points in Iowa, Kansas,

Nebraska and northern Missouri, which shall be the same as those contemporaneously in effect by way of short lines or routes on the basis of the distance scales prescribed in Western Cement Rates, 69 I. C. C. 644. The authorization is conditional: One provision specifies that new rates shall be subject to 33⅓, 50 and 70 per cent circuity limitations.

25220. **Limestone and Crushed Stone.** By Division 2. American Lime and Stone Co., et al. vs. Pennsylvania Railroad et al. (and two other related cases). Revision order based upon findings of unreasonableness and undue prejudice. Rates on ground or pulverized limestone from Martinsburg, Millville and Engle, W. Va., to points in New Jersey, Delaware, Maryland, Pennsylvania, West Virginia, and D. C., found unreasonable. Rates from Lime Crest, N. J., on crushed stone to points in trunk line territory, and on ground or pulverized limestone to points in trunk line in New England territory also found unreasonable and reparation awarded. Related cases: Rates on ground or pulverized limestone from Martinsburg, Engle and Millville and on ground or pulverized limestone from Lime Crest to trunk line territory destination found unreasonable in future to extent that they may exceed rates set forth subject to the addition of 70c a ton for hauls involving car-float or lighterage service. Rates for the future for typical distances for single and joint line hauls with single line rate first and the joint line rate second follow: 5 miles, 60 and 80c; 50 miles, 100 and 120c; 100 miles, 135 and 150c; up to 400 miles, 265c. (Beyond 180 miles the rates are the same for both single and joint line hauls.) Tabular basis for reparation computation given. Emergency charges authorized.

22908. **Industrial Sand Cases,** 1930, the Commission has prescribed a basic scale for rates to be made effective not later than December 31, for use in Official Territory. The basic scale applies on sands other than silica and tripoli, ground or pulverized, and certain traffic in open-top cars. The scale begins with a rate of 80c a ton for ten miles and under, becoming 140c at 100 miles, 220c at 300 miles, 350c at 700 miles, 450c at 1100 miles and 550c at 1500 miles. Minimum 60,000 lb. Column nineteen rates are to apply on silica and tripoli. Rates on ground and pulverized sand are to be 10% higher than the basic scale rates. Arbitraries are provided for New England and group on Long Island. On traffic moving through New York harbor an arbitrary of 70c a ton may be applied. Rates from the Ottawa district to the Chicago district were found not unreasonable.

Proposed I. C. C. Decisions

26477. **Agricultural Limestone.** American Agricultural Chemical Co. vs. N. Y. N. H. & H. By Examiner J. P. McGrath. Rates, agricultural limestone, Ashley Falls and Lee, Mass., and Canaan, Conn., to East Weymouth, Mass., proposed to be found unreasonable for the future to the extent they may exceed $2.30 a net ton from Lee. Ashley Falls and Canaan and unreasonable in the past to the extent they exceeded $2.65, plus a surcharge of 6c, prior to September 30, 1933, from Ashley Falls and Canaan and $2.65 thereafter. Reparation to that basis recommended. The consignor billed the shipments as agricultural limestone and the rates applied were those named in the tariffs on agricultural limestone. The complainant contended the commodity was dolomite, a commodity used by steel makers, while the complainant used the ground limestone as a soil corrective. The complaint alleged undue prejudice by reason of rates of $1.30, Ashley Falls to East Hartford, and Bridgeport, Conn., and $1.85 to Lowell, Mass., where other fertilizer manufacturers receive a commodity akin to dolomite on the dolomite rates. The examiner said the question of the applicability of the dolomite rates to the commodity shipped to complainant's competitors was not before the Commission in this case. But he said that the continued use of the terms dolomite and agricultural limestone would leave room for reasonable doubt as to the proper application of the dolomite rates. He said the Commission should find that the rate assailed from Ashley Falls, in its relation to the rates on dolomite from that point to Lowell, East Hartford and Bridgeport was and for the future would be unduly prejudicial to the complainant and unduly preferential of its competitors at the other points named to the extent it exceeds or may exceed the rate on dolomite to Lowell and to the extent it exceeds or may exceed the dolomite rates to East Hartford and Bridgeport by more than 55c a ton. Reparation on account of undue prejudice proposed to be denied.

20039. **Agricultural Limestone.** National Mortar & Supply Co. vs. Ann Arbor et al. By Examiner W. A. Disque. Upon further hearing rates, agricultural limestone, Gibsonburg, Ohio, to destinations in the lower peninsula of Michigan proposed to have been found unreasonable to a greater extent than heretofore found to have been the case. Reparation proposed. Previous reports 152 I. C. C. 429, and 191 I. C. C. 188. In the original report, division 3 found that on agricultural limestone, Gibsonburg, to destinations in the lower peninsula of Michigan to which reductions had been made August 26, 1926, the rates were unreasonable prior to that date to the extent they exceeded the rates established on and maintained after that date, which were found not unreasonable. Rates on that commodity from Gibsonburg to destinations in the lower peninsula which were not reduced on the day mentioned were found unreasonable in the past and for the future to the extent they exceeded the Michigan intrastate commodity rates scale. Reparation was awarded on prepaid shipments. Upon further hearing division 2 in 191 I. C. C. 188 affirmed and adopted the findings of division 3 as to the rates on shipments which moved prior to the date of the second report, which was February 8, 1933, except that certain new requirements for the past and future were made in finding No. 5. That division also modified the findings as to the future by prescribing generally lower rates. In this report Examiner Disque said the record established that the rates assailed were unreasonable for application on past shipments to the extent that they exceeded those found reasonable in the original report as modified by the second report except that to intermediate points mentioned in the report they were unreasonable to the extent they exceeded the Michigan scale; that to named points such as Lansing and Wakalee, they were unreasonable to the extent they exceeded the Michigan scale applied according to findings No. 5; and that to other points they were unreasonable subject to the before mentioned limitations to the extent that they exceed the Michigan scale applied according to finding No. 5 modified so as to provide for the application of the single-line scale to single-line short-line distances and the respective joint-line scales to their corresponding joint-line short-line distances, the lowest of the bases to apply from and to any given point. Reparation proposed on shipments made by the complainant in competition with a competitor at Sibley, Mich., the examiner saying that the complainant had to meet the deliberate prices of its principal competitor, the Sibley producer.

16747. **Sand.** George W. Pyott Sand and Gravel Co. et al. vs. Atchison, Topeka and Santa Fe Railway and other lines. By Examiner J. Edgar Smith. Dismissal recommended because of delays attributed to the complainant in filing useless and "cumbersome" testimony.

26236. **Silica Sand.** Hess and Moneyham, Inc., vs. A. T. and S. F. and other lines. By Examiner L. H. Macomber. The rate on silica sand in box cars from Ottawa, Ill., to Dallas, Tex., declared unreasonable to the extent it exceeds or may exceed rate prescribed in case 17,000, part 11-A, on silica sand for distance computed over the shortest route between the two mentioned points. Rate declared unreasonable in the past to the extent it exceeded the case 17,000 rate computed on the basis of actual routing. Reparation and rates for future proposed.

20733. **Sand.** By Examiner Paul A. Colvin. Abendroth Brothers et al. vs. B. and A. and other lines. Amounts of reparation due on sand from New York points to Stamford, Conn., determined.

22476. **Sand.** By Examiner T. B. Johnston. H. B. Smith Co. vs. N. Y. N. H. and H. et al. Reparation of over $22,500 proposed on account of unreasonable rates on sand from Muskegon, Mich., to Westfield, Mass.

25738. **Lime.** By Examiner E. L. Glenn. Muscle Shoals White Lime Co. vs. A. and B. and other lines. Rates on common or hydrated lime from Denie, Ala., to Akron, Ohio, recommended as not unreasonable in the past but unreasonable for future to the extent they may exceed $5.20 a net ton on minimum carloads of 50,000 lb. or $6.50 a net ton on minimum cars of 30,000 lb.

26260. **Chatt and Crushed Stone.** By Examiner J. P. McGrath. St. Joseph Lead Co. et al. vs. Baltimore and Ohio Railroad. Rates on crushed limestone used as soil corrective from Bonne Terre and other Missouri points to destinations in southern Illinois held unreasonable and in their relation to intrastate rates on the same commodity within southern Illinois, unduly prejudicial to complainants and unduly preferential to Illinois competitors.

15427. **Cement.** By Examiner R. G. Taylor. Iola Cement Mills Traffic Association et al. vs. Abilene and Southern et al. (and related cases). Recommendation that the commission declare intrastate rates on cement between points in Texas not unduly prejudicial or preferential in relation to the interstate rates from the Kansas gas belt producing point. Position taken that truck competition, either actual or impending, forced Texas railroads to establish produced intrasate rates on cement in Texas.

Slag Reparation

THE Interstate Commerce Commission has awarded reparation of an undetermined amount to the Birmingham Slag Co., Birmingham, Ala., from the Blue Ridge Railway company and other lines. The reparation order was based upon shipments of slag from Ensley and Woodward, Ala., to Walhalla, S. C., upon which the rate of $1.75 per ton was charged. The commission stated that $1.65 was a reasonable charge.

Cement Manufacturers Required to Submit Costs as Well as Cement to TVA

BIDS on "Type B portland cement" were received October 11—300,000 to 1,500,000 bbl. for delivery before January 1, 1936, and 1,500,000 to 6,000,000 bbl. before January 1, 1941. Type B portland cement specifications are practically identical with the proposed new tentative specifications of the A. S. T. M., now being voted on by the Society, and is variously known as "sulfate resistant," "modified" and "moderate heat" portland cement. Its chemical composition is tricalcium silicate ($3\ CaO.SiO_2$) not less than 35% nor more than 55%; tricalcium aluminate ($3\ CaO.Al_2O_3$) not more than 8%. The fineness, by the Wagner Turbidimeter, is not less than 1600 nor more than 2200 sq. cm. per gram.

The TVA has constantly been threatening to build its own cement plant, and had let it be known that the bids received would weigh heavily in determining whether or not to continue buying cement or to make it. Thus manufacturers were put in the unique position of being compelled to divulge their cost data to a purchaser who openly threatened to become their competitor.

The proposals required that the price of cement as established in the contract shall be subject to adjustment, up or down, to provide for changes in cost elements. Also included in the proposal is a copy of the President's executive order of June 29, 1934, authorizing a 15% cut in code prices on government work.

Government to Get Cost Figures

The contract provides that within ten days after the award the cement manufacturer shall furnish to a firm of certified public accountants, designated by TVA and approved by the successful bidder, a statement showing the following facts concerning the operation of the contractor's plant (from which cement is to be furnished under this contract) for the nearest calendar month preceding October 1, 1934, throughout which the plant operated:

(1) *Labor* (*a*) The number of man-hours required to produce one barrel of cement. (*b*) the contractor's average labor rate in cents per hour.

(2) *Fuel* (*a*) The number of pounds of coal or standard units of other fuel required per barrel. (*b*) the contractor's cost, in cents per pound, of coal or standard units of other fuel delivered to the plant.

(3) *Raw Materials* (*a*) The number of pounds of purchased raw materials, as defined above, required per barrel. (*b*) Contractor's cost, in cents per pound, of purchased raw materials, as defined above, delivered to the plant.

(4) *Power* (*a*) The number of kw.h. of purchased power required per barrel. (*b*) The contractor's cost in cents per kw.h. of power delivered to the plant.

Upon receiving the above information from all contractors the said accountants shall, under their certificate, furnish to the Authority, within ten days after the making of the awards: (1) a computation showing the average for all contractors of the above Items 1 (*a*), 2 (*a*), 3 (*a*), and 4 (*a*); and (2), the information called for by the above Items 1 (*b*), 2 (*b*), 3 (*b*), and 4 (*b*) for each plant of each contractor from which shipments of cement will be made. The applicable computation for each contractor (hereinafter referred to as "the schedule") shall be annexed to and made a part of his contract.

The schedule so determined shall be used as a basis for future price adjustments. If during the period while the contract is in effect, the contractor's cost of manufacture is increased or decreased by reason of changes in Items 1 (*b*), 2 (*b*), 3 (*b*), and 4 (*b*), an adjustment in the price of cement furnished after January 1, 1935, shall be made in the net total sum of said increases and decreases in costs.

Items 1 (*a*), 2 (*a*), 3 (*a*), and 4 (*a*) shall be multiplied, respectively, by the net changes (at the contractor's plant from which cement is supplied under the contract), in cents per item in Items 1 (*b*), 2 (*b*), 3 (*b*), and 4 (*b*) of said schedule, and the algebraic sum of the resulting products shall be the increase or decrease per barrel to be applied to the contract price. No changes in the contract price of cement shall be made unless the increase or decrease shall equal or exceed 5 cents per bbl., and no change shall be deemed to have occurred in Item 1 (*b*) unless the rates of pay for given labor classifications shall have been increased or decreased, such latter fact to be determined by the accountants acting under this provision.

The contractor, at any time, may notify the TVA in writing of any increase in his cost of manufacture due to changes in Items 1 (*b*), 2 (*b*), 3 (*b*), and 4 (*b*), indicating specifically (1) the elements of cost said by him to have increased since October 1, 1934, and the amount thereof. (2) the date when any such element of cost is said to have increased, (3) the period during which said increase has prevailed, and (4) the change of price of cement deemed necessary by him to compensate for such increase in his cost of manufacture.

Price Increases Possible

Upon receipt of such notice, the TVA, in its discretion, may make the price adjustment requested, or may have the aforementioned accountants (or other accountants designated by it, and approved by the contractor) ascertain the facts upon which the request for price change is based. For such purpose, the accountants must be permitted by the contractor to verify the statements set forth in the contractor's request for price adjustment, and under their certificate report to the TVA whether the contractor's cost of manufacture has increased, as determined in accordance with the above formula. The report must indicate the date as of which such increase became effective and the period of time during which it prevailed. Upon receipt of report certifying such increase, the TVA must make an adjustment in price retroactive to the date specified by the accountants. The cost of the original audit made by the accountants and any further audits made by them in connection with requests for price increases is borne by the contractor.

The TVA is entitled to a reduction in the price of cement on account of any decrease in the contractor's cost of manufacture, as determined in accordance with the above formula, and upon asserting a claim therefor, the TVA is entitled to receive from the contractor, within ten days after notice to the contractor, a statement from the contractor setting forth as of the date of receipt of such notice: (1) the information specified above in Items 1 (*b*), 2 (*b*), 3 (*b*), and 4 (*b*); (2) the date when any of said items of cost decreased; and (3) the period during which such decrease has prevailed. The TVA at its option is further entitled at its own expense to have the facts pertinent to such statement verified, and the matter of a price adjustment determined, by accountants.

The contractor must furnish to the TVA within ten days after January 1, April 1, July 1, and October 1 of each year, a report showing 1 (*b*), 2 (*b*), 3 (*b*) and 4 (*b*) covering the last full month of operation preceding the period covered by the report. Adjustments in price due to decreases in the contractor's cost of manufacture as determined in accordance with the foregoing formula must be retroactive to the date of such decrease, and deducted by the Authority from the payments made.

On October 15, Arthur E. Morgan, chairman of the Tennessee Valley Authority, announced that the TVA had decided to buy from commercial producers the 6,000,000 bbl. of cement required for construction of dams and power plants in the Tennessee Valley, instead of manufacturing its own cement.

Prices for cement delivered to Norris dam in east Tennessee were announced as $1.7384 per bbl. and to Joe Wheeler dam in Alabama, $1.8798 per bbl.

Norris dam requires about 800,000 bbl. and Joe Wheeler dam 700,000 bbl.

"For several months," Chairman Morgan said, "the TVA and the cement industry have conferred, first to determine what is a fair price for cement, and second, what it would cost the TVA to make cement on the Tennessee river at Sheffield, Ala., where both raw materials and cheap power are exceptionally available, and what it would cost

to ship it by cheap water freight to the dam sites on the river.

"The TVA and the cement industry," he added, "did not come to full agreement, either on a fair price for cement or on the cost of making cement at Sheffield.

"There was fairly complete agreement as to direct manufacturing costs, the principal differences being on such items as interest, depreciation and selling costs. The TVA was willing to pay more than it believed to be the probable cost of making cement at Sheffield and delivering it to the dam sites, rather than to construct and operate an additional plant in an already overbuilt industry.

"The TVA believes that the price it is willing to pay is reasonable and fair under all the circumstances. The cement manufacturers, on the other hand, rather than have another plant built, have bid prices which they hold are less than fair prices, especially at the low rate of production now prevailing in the industry, and they have met the maximum price which the TVA was willing to pay."

The companies that entered bids were: Volunteer Portland Cement Co., Knoxville, Tenn.; Alpha Portland Cement Co., Birmingham, Ala.; Universal Atlas Cement Co., Chicago; Kosmos Portland Cement Co., Louisville, Ky.; Marquette Cement and Manufacturing Co., Chicago; Louisville Cement Co., Louisville, Ky.; Lehigh Portland Cement Co., Allentown, Pa.; Hermitage Portland Cement Co., Nashville; Cumberland Portland Cement Co., Cowan, Tenn.; Signal Mountain Portland Cement Co., Chattanooga; Lone Star Cement Co., Birmingham; National Cement Co., Birmingham, Ala.; Georgia Cement and Products Co., Atlanta; Pennsylvania-Dixie Cement Co., Chattanooga, Tenn.

Modernization Program Proving a Success

THE FHA, perhaps because it has a go-getter type business man at its head, is being considered the most successful government agency in recovery efforts. According to James A. Moffet, Administrator, up to the middle of October, some $50,000,000 in home repair and modernization work has been launched as a result of the Federal Housing Administration's two-month-old campaign. Loans made directly by the administration approximate $10,000,000. A like amount has been advanced through finance corporations of supply houses, and through direct bank loans. The balance is the FHA's estimate of the cash business brought out by its drive, based on detailed surveys in various districts. Testifying to the "recovery" effects of the program are a mounting heap of letters and telegrams on the Administrator's desk like this: "Sacramento reports 1,000 increased employment in the building trades this month over last. Material dealers extremely busy and not a painter to be had." Two and a half weeks ago probably the largest plumbing and heating supply manufacturer in the country advised the FHA that in the first 43 days of the housing campaign the company had done 41% more modernization business than in the whole year 1933. After 60 days of the campaign it did 125% more modernization business than in all of last year. Simultaneously with the FHA's efforts, another powerful spur to revival of the building industry has been coming from the Home Owners Loan Corp. To date its loans to put mortgaged homes in good repair approximate $16,000,000.

News Briefs

Cement

Canada Cement Co., Ltd., Montreal, Que., according to press reports, for the first nine months of 1934 had an increase of about 20% in sales over the same period of 1933.

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San Juan, Porto Rico: The erection of a 200,000-bbl. cement plant by the government was indicated by Major Edwin Eckel, chief geologist of the Tennessee Valley Authority, as he commenced a study of Puerto Rico's mineral resources. He will report on the economic possibilities of the enterprise, one of several he said he believed the island could develop in a carefully planned industrial program. Normally the island imports 400,000 bbl. of cement annually, the United States Government being the largest purchaser.

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Huron Portland Cement Co., Detroit, Mich., has been awarded the contract to furnish cement for Grand Haven, Mich., harbor improvements. The cement will be supplied from a new floating plant and distributing headquarters on the Bauknecht dock, Muskegon, Mich. The company is planning later to erect concrete silos and an office structure to comprise a permanent Muskegon branch. Heretofore, cement for construction of the Muskegon channel revetment during 1933 and 1934 and for other western Michigan port projects had been shipped from the Milwaukee packing plant of the company. Since the establishment of the Muskegon plant, temporarily aboard the freighter *John W. Boardman,* tied up at the Bauknecht dock since last June, western Michigan business has been handled from this branch. The company is now covering a territory extending from St. Joseph and Benton Harbor to Frankfort, Beulah and Benzonia and inland to Evart and Grand Ledge. This includes such cities as Grand Rapids, Kalamazoo, Grand Haven, Ionia, Holland, Ludington, Manistee and South Haven.

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Aetna Portland Cement Co., Detroit, Mich., wishes to correct the news item published on p. 36, ROCK PRODUCTS, October, 1934, as follows: The company is manufacturing its special cements, high-early strength, masons' mortar cement and waterproofed cement, at its Fenton plant. A. E. Hiscox is chief chemist in connection with these operations.

Portland Cement Association, Chicago, Ill.: Program of co-operation with the Federal Housing Administration includes: (1) Persuading contractors, concrete products manufacturers, ready-mix concrete companies and other concerns who make concrete or do concrete work to get behind the housing program; (2) Conducting meetings of contractors in principal cities throughout the country to explain the FHA and show them how they can help get local modernization programs under way in their communities; (3) Furnishing them with circulars, check lists of improvements, suggested advertisements, publicity material and other aids for use in promoting community campaigns; (4) Getting contractors to serve on their local campaign committees; (5) Releasing to newspapers throughout the country publicity matter designed to convince home owners of the advantage of making needed improvements; (6) Circulating information on the details and progress of the modernization program to all cement companies; (7) Co-operating daily with the various divisions of the Federal Housing Administration to carry out the modernization and other programs under the National Housing Act.

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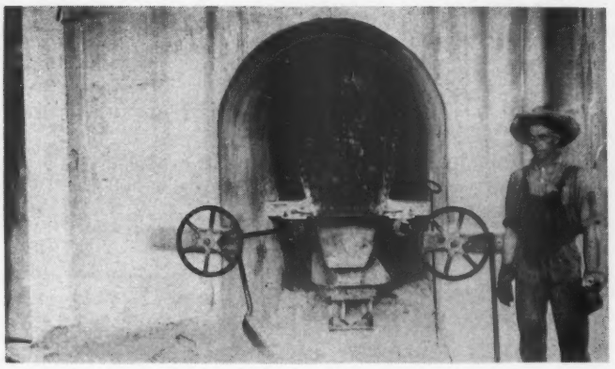
Silica

Flint Sands, Ltd., Toronto, Ont., reports that it is actively developing a large deposit of free running, high grade silica sand near St. Bruno, de Guigues, in Quebec, about two miles east of Lake Temiskaming. The company claims that its deposit has been adequately tested by test shipments to commercial users who have found the company's product satisfactory. The average imports of this product, which is largely used in steel moulding, fire cement and fire brick, filtration, sand blasting and other industrial uses, have been approximately 125,000 tons per year for the past five years. The property in Quebec is equipped with a 100-ton mill. The company has under option 210 acres on what is believed to be the only high grade, free running silica sand deposit in eastern Canada. To develop this property a company has been organized with a capitalization of $100,000, consisting of 3,500 7% preferred shares and 6,500 common shares, each class of stock having par value of $10. Besides Mr. Peacock, officers of the company include T. M. Peacock, secretary-treasurer; J. M. Hazelton, J. E. Currie and C. E. Dickinson, directors.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.



Old (above) and modern (right) methods of drawing lime. Capacity with latter is two tons of lime every few minutes.

(Discussion continued from October issue on Lime Kiln Coolers)

Back pressure in the hot zone counteracts the cooler draft and with a 0.1 in. pressure it would stop the flow through the cooler by out-balancing the cooler draft effect. With the flow interrupted the cooler temperatures would immediately rise and the draft effect would become greater, but could not become great enough to overcome the hot zone resistance. Some air will still enter, but the general effect will be much hotter lime drawn.

If one has a sensitive draft gauge, it is possible to determine the temperature of the lime in the cooler. To do this, the gauge should be connected to the hot zone, then the kiln damper should be shut until the gases just begin to come out through the draw gates. The gauge will then show the stack effect of the cooler.

The stack effect of the cooler varies, as is indicated in the following table. The effect given is per foot of height in inches of water pressure for outside air at 40 deg. and 100 deg. F.

DRAFT EFFECT

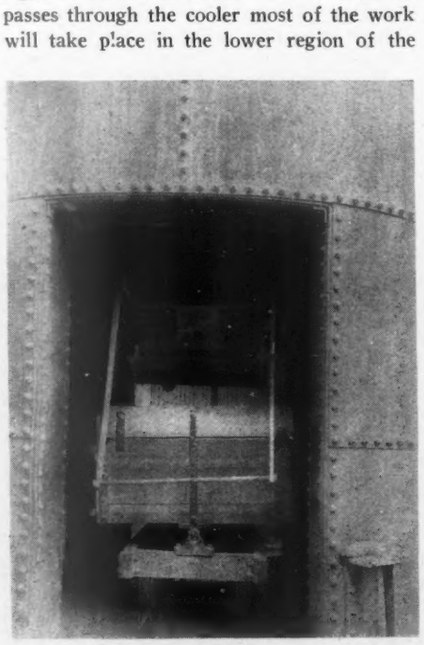
Temperature in cooler deg. F.	Outside air 40 deg. F.	Outside air 100 deg. F.
200	0.0037	0.002 in.
400	0.0064	0.0047
600	0.0081	0.0064
800	0.0093	0.0075
1000	0.01	0.0084
1200	0.0107	0.009
1400	0.0112	0.0095
1600	0.0115	0.0099
1800	0.0119	0.0103
2000	0.0122	0.0105

For an average temperature in the cooler of 800 deg. F. and a 14 ft. cooler height, on a hot summer day the draft effect will be only 0.105 in. water gauge. If but little air passes through the cooler and the temperature therein is at the average of 1200 deg. F., the draft is more, or about 0.15 in. of water gauge.

It is possible to evaluate cooler performance in many ways. The simplest is judgment by the hotness of lime drawn. The first cart may be cool. If second cart is hot when cooler is generous in dimensions, then that is a sure indication that insufficient air is passing through. In properly operated coolers more than half the lime should be drawn, the equivalent of three 3-hour draws, before redhot lime appears.

If a kiln produces 35 tons, and the cooler contains 16 tons, it will be emptied in four 3-hour draws; that is, lime passes through it in 12 hours.

If plenty of air passes through the cooler, due to great temperature difference, most of the work of heat transferring will take place right below the hot zone. If too little air passes through the cooler most of the work will take place in the lower region of the cooler. This is shown at *A* and *B* of Fig. 2. *A* represents poor conditions, little air enters the cooler, but that air is quickly preheated almost to the temperature of the lime, and the lime is drawn hot because the cooling medium is in deficiency.



Lime drawing arrangement requiring two operators—but still preferable to that shown at left above.

B on the other hand represents good conditions. There is plenty air to cool the lime; and, due to high temperature difference right below the hot zone, it cools very quickly. The air never gets very hot because there is not enough heat in the lime to get it hot, but due to its greater weight it still absorbs more heat from the lime than in case *A*, naturally, as in one case lime is drawn hot, in the other it is drawn cool.

Under *B* conditions the cooler will be at much lower temperature, its draft effect will be less, and so its capacity to draw air also less. To pass all the air through it that one desires, there must be suction in the hot zone, or air is forced into the cooler bottom. The last is seldom or never resorted to excepting only in mixed-feed kilns, but it seems to be the logical way of getting air into the kiln, particularly when kilns are of the forced draft type.

Getting air into and through the cooler is, however, not such a great problem as getting this air properly distributed in the hot zone. Lacking this distribution will cause the kiln to operate very non-uniformly. There will be intensively hot spots, and again there will be rocky sections, the middle of shaft particularly will tend to be cool. This tendency can, however, be combated by piers built across the shaft to retard the lime flow in the middle, by application of center burners whenever possible, but mainly by having the combustible gas stream enter at a high velocity, with a deep penetration to it, and considerable turbulence. A lazy entrance of the combustible gas stream almost always means trouble with a cool shaft center.

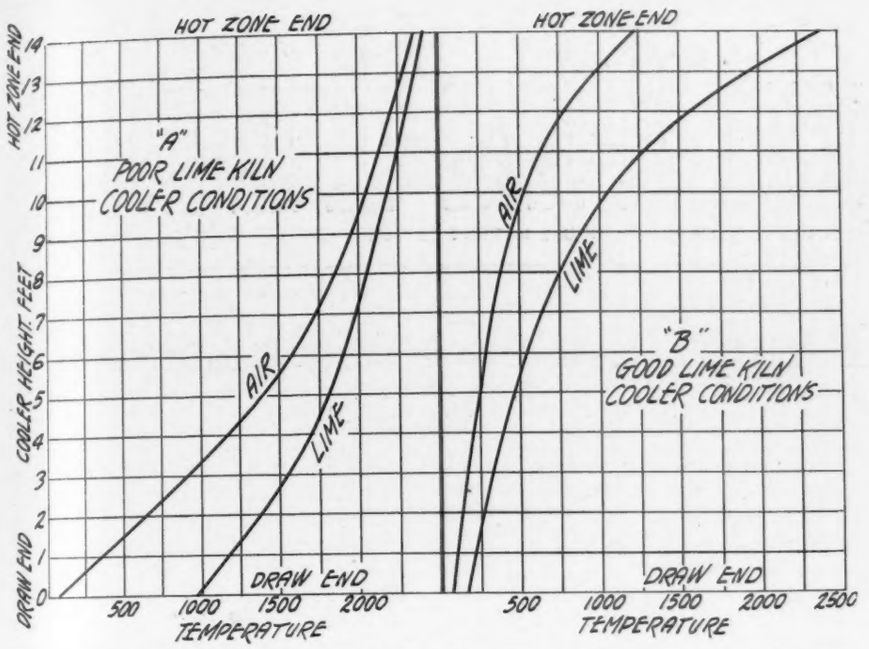


Fig. 2. Showing comparison of "poor" and "good" draft conditions in a lime kiln

Accidents in the Lime Industry Excessive

ACCIDENT RECORDS covering five years of operation of lime-manufacturing plants in the United States, together with the operation of the quarries associated with the lime kilns, according to the Bureau of Mines, reveal an accident-frequency rate of 61.7 per million man-hours of exposure to risk and an estimated accident-severity rate of 5.2 per thousand man-hours of exposure. The rates for quarrying at these plants, as distinguished from those for lime-burning, were 80.5 for frequency and 7.1 for severity; corresponding rates for lime-burning and other non-quarrying operations at the same plants were 47.9 for frequency and 3.7 for severity. Two hundred twenty-five plants were represented, some of which were operated during each of the five years while others were idle during one or more years of the 5-year period. These rates may be considered the normal or non-disaster accident rates of the lime industry, because a major accident in which 7 men were killed at one time at one of the plants in 1933, is not included.

When the accident-frequency rates for the lime industry are compared with those for all quarries in the United States including all related operations outside the quarries, the records of the Bureau of Mines show that the rates for the lime industry have exceeded the general rates by 27 to 48% during the four years 1929 to 1932, the latest years for which figures are available for both groups.

That accidents at lime plants can be prevented is clearly indicated by the fact that many individual companies are operating their plants without a single disabling injury to an employe.

A special tabulation covering 67 plants that were in operation during each year, 1929 to 1933, shows that 12 were operated without accidents in 1929, 14 in 1930, 17 in 1931, 21 in 1932, and 28 in 1933. The man-hours of exposure at these accident-free plants were 903,030 in 1929, 988,105 in 1930, 1,169,749 in 1931, 785,001 in 1932, and 1,128,474 in 1933. While most of these companies were small, several of them were large, as indicated by the fact that their exposure ranged from 100,000 to more than 300,000 man-hours per year.

Story of a British Quarry Owner's Failure

EVIDENTLY British receiverships are attended with more publicity than those in the United States. The following is from the *Quarry Managers' Journal*, which in turn took it from the *Scarborough* (England) *Evening News*. In the United States much publicity is given to "success" stories, and practically none to stories of failure, which are just as interesting and probably more helpful—especially where as in this case they are "confessions." Such publicity as contained in this story should be helpful in prevention of over-planting the industry, or over-production, as it is usually called. Here is the story, verbatim (the reader should remember a pound sterling, £, is equivalent to $5 in round figures; he will have to make his own interpretation of some of the English legal phraseology):

"The unsuccessful trading of Joseph Victor Wetton, of Kerridge, near Macclesfield, carrying on business as the Cheshire Stone Company, was investigated at the Macclesfield Bankruptcy Court before the Registrar, Mr. H. G. Barclay. The inquiry was conducted by the Official Receiver (Mr. P. M. Milward).

"The statement of affairs revealed liabilities expected to rank for dividend £5,489 14s., with assets estimated to produce £170 3s. 8d., and with a deficiency of £5,339 19s. 1d.

"Debtor attributed his failure to three falls of earth, heavy overhead expenses, and unbusinesslike disposal of assets.

"Debtor stated that up to 1927 he was employed as a bank clerk, and owing to the illness of his father became a director and salesman of the firm of J. Wetton and Sons, Ltd., and was so employed until November, 1930, salary and emoluments averaging about £9 a week. In November, 1930, he commenced business on his own account as a stone merchant, obtaining the lease of two quarries at Kerridge, another one at Rainow, and a fourth at Pott Shrigley. He traded at the Cheshire Stone Co., his commencing capital being £50 of his own and £700 lent to him by his mother-in-law. As considerable clearance had to be done, he also obtained financial help from a bank.

"The gross profits amounted to £1,061 in 1931 (net £109), £1,672 in 1932 (£352), and £1,320 in 1933 (£182), and his drawings over the same period were £500, £552 and £530 respectively.

"In July, 1931, and June, 1932, 'falls' occurred at his quarries costing £700, while a third took place in August, 1933, which involved him in expense of about £1000 to clear, and this impeded his trading operations. In January, 1934, he discussed his financial position with a person named Milward, and transferred to him the lease of the Gag Quarry and the Albert Quarry for £50, and as from January 31st the purchaser assumed control of the quarries and had since carried on business there under the style of the Kerridge Stone Co., paying him a wage of £3 10s. a week as manager. In March the bank issued a writ for £3640, and the purchaser intimated his willingness to hand back the assets, but the lessors of the quarries stipulated for a guarantor before consenting, and he called a meeting of his creditors. He first realized he was insolvent in August, 1933, when the large 'fall' occurred."

Lime

Statistics of production and shipments of lime for the year 1933 have recently been released by the U. S. Bureau of Mines. The lime sold by producers in the United States in 1933 amounted to 2,269,280 short tons, valued at $14,253,659. This represents increases of 16% in both quantity and value as compared with 1932. Sales of hydrated lime, which are included in the above totals, amounted to 840,007 tons, valued at $5,622,026, a decrease of 1.5% in quantity and an increase of 5% in value.

Cement Products

Concrete Rough Boxes for Burials

Springfield, Illinois, Company Develops New Design

THE USE of concrete rough boxes to replace the conventional rough pine box, used as casket protection in burials is not a new idea. However, during the past three or four years considerable thought and interest has been given to this subject by concrete products manufacturers and cemetery superintendents. The interest of cemetery superintendents is due to the increase in cost to cemeteries furnishing perpetual care, caused by sunken graves as the wooden boxes rot out.

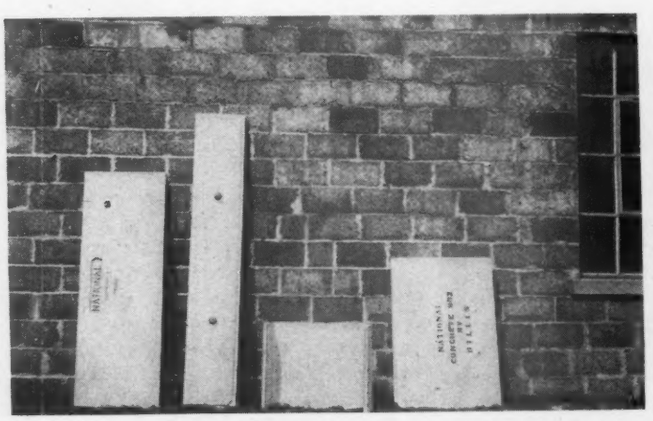
A number of cemeteries have passed regulations eliminating the use of wood boxes for future burials, expecting in this way to reduce their annual maintenance charges to a very marked extent during the next five to ten years.

The increased interest evidenced by concrete products manufacturers is due to advance in technique of making thin slabs of reinforced concrete. Under this heading comes the water-cement ratio law for controlling the strength, grading of aggregates, increased use of vibration and availability of light weight aggregate.

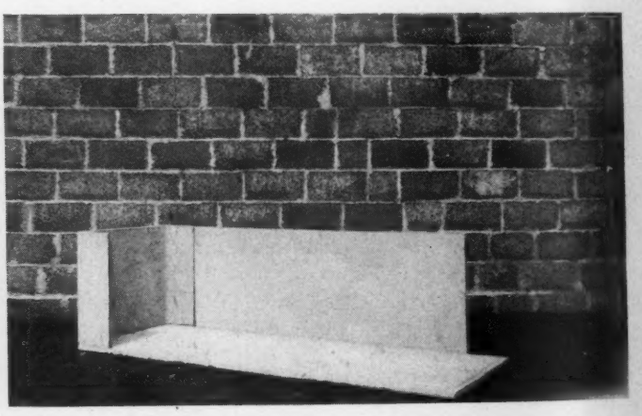
To be satisfactory in service the concrete rough box should be sufficiently strong to prevent sunken graves and be constructed so that they can be placed in the grave by two men. The first requirement is a problem in reinforced concrete design; the quality of concrete required and the load to be sustained are fully covered in the American Concrete Institute specifications for concrete burial vaults.

To satisfy the requirements for handling, these boxes have usually been made in six or more sections. Sectional boxes can be used because no attempt has been made to provide watertight containers. These six sections, consisting of a top and bottom, usually identical, two ends and two sides, have a total weight of about 900 to 1000 pounds. The maximum weight of any one piece is held to the lowest practical minimum and should not exceed 200 or 250 pounds. In the six-piece box the top and bottom will weigh about 250 pounds apiece when made with sand and gravel and will weigh about 200 pounds when made with light weight aggregate.

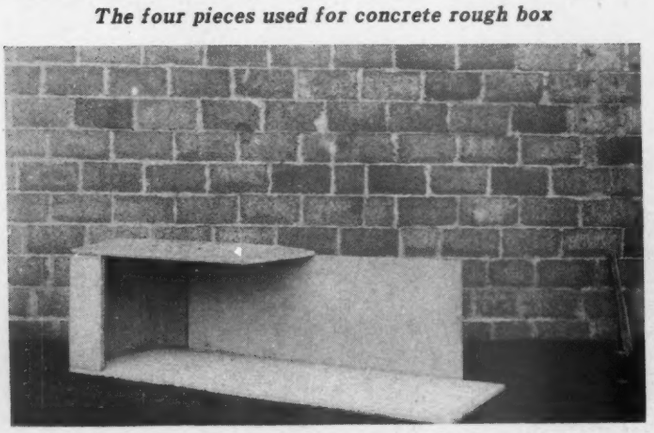
The National Concrete Box Co., Springfield, Ill., has developed an eight-piece box



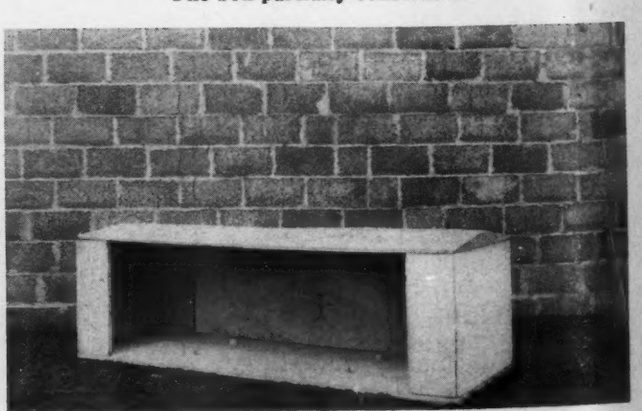
The four pieces used for concrete rough box



The box partially constructed



The cover placed in position



Box complete except for side piece

Box on scale platform, ready for test

providing for a two-section bottom and a two-section top, thus reducing the maximum weight of any one piece to less than 135 pounds. Because of this reduction in weight it is stated that two men can place this sectional box in position in the grave in ten or fifteen minutes.

The series of photographs shows the various stages in assembling and testing these boxes:

(1) The four pieces, two each of which are used in assembling the box, are shown in this photograph. The sides in order, are: One side piece, one bottom piece, one U-shaped end piece and half of the cover.

(2) Shows the two bottom pieces in position with one U-shaped end piece and one side piece in position.

(3) Shows the cover placed in position on the pieces shown in photograph No. 3.

(4) Shows complete assembly of the box with the exception of one side piece.

(5) Shows the box assembled on scale platform, ready for test.

They have been very successful in selling the better class of undertakers on the desirable features of this concrete rough box.

The company has photographed the box sustaining a load of 100 sacks of sand and two men, weighing 11,200 lb. This is equivalent to more than 600 lb. per square foot.

The load test is one of their most convincing arguments both with cemetery superintendents and undertakers.

This company is in a position to furnish molds for making this box to other products manufacturers who are interested in this product.

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Concrete Products

P. C. Bradley and E. R. Courrege, New Iberia, La., have built a plant to manufacture "dunbrik," a patented type of concrete brick.

Cement Products News Briefs

Richfield Brick and Tile Co., Albemarle, N. C., will begin shortly the manufacture of concrete brick and tile in various colors. O. D. Ritchie and M. M. Ritchie are the principals.

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Westinghouse Electric and Manufacturing Co., St. Louis, Mo., works, has received a contract for approximately 138,000 ft. of "Hollowspun" concrete tapered piles for the Twin Locks, No. 26, at Alton, Ill. There are about 4,300 units to be made.

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Lincolnton Brick and Tile Co., Lincolnton, N. C., is building a plant to make concrete brick and other products.

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Kansas City Concrete Pipe Co., North Kansas City, Mo., has added to its complete line of concrete sewer and culvert pipe, concrete blocks, etc., a new design of septic tank. "We know of no more valuable improvement to a rural or suburban home, where no sewers are available," said Mr. Main, president and general manager of the Kansas City Concrete Pipe Co., "than the installation of a septic tank system. We therefore made a study of costs and construction of existing methods and found that we could produce a precast reinforced concrete tank of larger capacity, one that would be permanent and eliminate the disadvantages of the smaller tanks, at a more reasonable cost. This tank is designed by a state sanitary engineer, is easily installed, and several plumbers have told us that it is the finest tank on the market. We naturally are watching this latest Federal campaign with interest as the spending of small amounts in improving homes, where needed, would be a great stimulation to the building trades, and the manufacturers of durable goods."

Austin Crabbs Untangles Code Troubles of Block Company

"IF YOU RETAIL cement blocks...we shall require you to file your prices with this office." This was the edict recently received by White Crete Block Co., Rockford, Ill., from the Illinois Retail Lumber and Building Material Code Authority. Appealing to Austin Crabbs, Davenport, Iowa, member of the code authority for the concrete masonry industry, the company had its case clarified.

Addressing the Illinois division (No. 6) of the retail building material code authority, Mr. Crabbs said: "There are three codes involved in this question, as follows: (1) Concrete masonry code; (2) builders' supplies code; and (3) retail lumber code.

"The first covers 'the manufacture, and *sale by those who manufacture,*' concrete blocks, the second includes 'cement products' as regards 'any member of the industry *not* directly engaged in manufacturing' and thus does not include a concrete block manufacturer even though he may sell at retail, and the third definitely excepts cement products.

"As we understand it, there is no overlapping of these codes. From the above I believe you will see that your office has no jurisdiction over the sale of concrete blocks by a manufacturer of same, even though such sales may be at retail, although you would have jurisdiction over materials such as concrete pipe, brick, aggregate, cement, etc., which the concrete block manufacturer might buy and resell and which were not of his own manufacture."

Recent Publications

Limestones of Canada. Part 2. Maritime Provinces. By M. F. Goudge, Department of Mines, Canada, No. 742, price 50c. The occurrence and characteristics of the limestones of Nova Scotia, New Brunswick and Prince Edward Island are described and illustrated, with geological maps.

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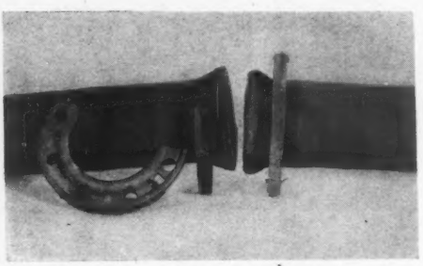
Sand-Lime Bricks. (British) Department of Scientific and Industrial Research; Building Research, Special Report No. 21, by G. E. Bessey, price 1 shilling, 3 pence. Probably this is the most complete and interesting treatise on sand-lime brick yet published. It describes at length the manufacture, properties and testing. Also given are methods of determining clay, soluble salts and organic matter in sand; tests of the suitability of lime; sampling brick, methods and apparatus for strength tests; methods for chemical analysis of brick, and a bibliography, with references to American, German, Russian as well as British literature on the subject. On the whole the treatise is quite complimentary and a sand-lime brick manufacturer can glean some good sales arguments as well as technical information from this report.

New Machinery and Equipment

New Hose Joint

SAID TO ELIMINATE all contact between metal and fluid, a new hose joint has been offered by B. F. Goodrich Rubber Co., "to permit greater flexibility, afford a perfect seal in all suction service and discharge service up to 125 lb. working pressure."



New dredge-pipe coupling

The new joint has been designed especially as a substitute for nipples and flanges. Its manufacturers claim it to be lower in cost.

Smoke Meter

A NEW PHOTO CELL smoke-density recorder compensated for variations in light source intensity and operated by a relay circuit is announced by Bailey Meter Co. Briefly, the equipment comprises a receiving element in the form of an attractive recorder and a transmitting element consisting of a projecting cylinder and a detecting cylinder mounted on opposite sides of the flue passage. Record of relative smoke density is made on a 12-in. uniformly graduated chart. This indicates stack conditions at all times of night and day.

Smoke density recorded by means of photo-electric cell device

Relation of Torque to Tension for Thread-Locking Devices

THE United States Bureau of Standards has issued research paper 386 by H. Whittemore, G. W. Nusbaum and E. O. Seaquist on "The Relation of Torque to Tension for Thread-Locking Devices."

The investigation was made to determine, under static loads, the torsional resistance to unscrewing of nuts, with and without locking devices, and the relationships these torques bear to the stresses in the bolt. The torque required to produce a given stress in the bolt was also determined for each device.

Twenty-four manufacturers of thread-locking devices accepted the invitation to submit samples of their devices for test and agreed to publication of the results.

A total of 41 devices were tested, including such devices as standard nuts, jam nuts and slotted nuts with cotter pins. Only about ¼ of these devices showed any appreciable difference in the static torque-tension relation from that of the American National coarse-thread standard nut.

A summary of the results with stresses indicated were as follows, using Dardelet thread as 1.00:

	Stress 10,000 lb. per sq. in.	Stress 15,000 lb. per sq. in.	Stress 20,000 lb. per sq. in.
B-US—Dardelet Thread (nut 1¼ in. across flats)	1.00	1.00	1.00
B—Dardelet Thread (nut 1⅛ in. across flats)	1.06	.96	.95
C—Special, permanent-set nut	.65	.97	1.04
D—Special, permanent-set nut	.75	.75	.81
F—Special, permanent-set nut	.59	.85	1.08
FF—Regular nut and spring washer having highest unlocking torque	.49	.58	.68
VIII—American National fine-thread castellated nut and cotter pin	.46	.50	.56
I—American National coarse-thread regular nut	.41	.51	.61
VI—American National fine-thread regular nut and jam nut	.38	.47	.56
III—American National fine-thread regular nut	.35	.44	.51

Synchronous Motor Starter Protected from Dust

A SYNCHRONOUS MOTOR STARTER, entirely enclosed in cubicles for protection against dust, was recently built by the Westinghouse Electric and Manufacting Co., East Pittsburgh, Penn. In it are three compartments. One contains an incoming line circuit breaker with disconnects switches, while each of the others houses an individual synchronous motor starter with an electrically operated breaker and an individual disconnect switch.

Each compartment is provided with a lock to prevent unauthorized attention.

Celebrating Golden Anniversaries

MARION STEAM SHOVEL CO. has published a "gold" covered issue of its house organ, "The Groundhog," in celebration of its 50th year in business. The booklet contains much interesting history on the development and use of the various types of shovels. There are chapters on developments in the principal shovel using industries. From the chapter on "Non-Metallic Mining" one learns that the first Marion steam shovel applied to quarry operation was in 1887 at Excelsior Switch, Ill., for the Corneau Stone Co.

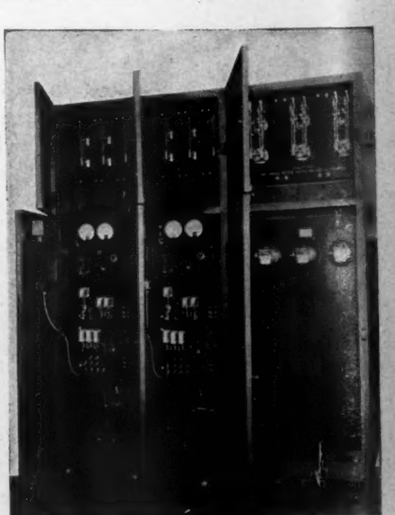
The first Barnhart Style "A" shovel was placed in gravel bank at Greenville, Ohio.

* * *

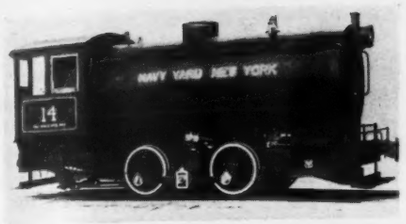
HARNISCHFEGER CORP. has published a "gold" covered booklet in celebration of its 50th anniversary, or rather the 50th anniversary of "P & H" products. The P & H was not so early in the shovel line as those of other manufacturers, but was one of the pioneer gasoline-powered shovels. This booklet is more in the nature of a "de luxe" catalog, and illustrates many kinds of machinery the company makes.

Roller Bearing Equipment of Industrial Locomotive

DETAILS of a new 50-ton fireless geared locomotive made by the H. K. Porter Co. are interesting, although fireless locomotives are not used to any extent in the rock products industries. The Timken roller bearing equipment is probably of the most interest, as this is a development or refinement that may eventually be applied to practically all industrial locomotives.



Enclosed switchboard for starting synchronous motors



Fireless 50-ton locomotive

Timken tapered roller bearings are used throughout, the main driving journals being so equipped, and six sets being used in the gear box. Friction is reduced to such a low figure that it is claimed two men can easily push the locomotive around, when side rods are not in position.

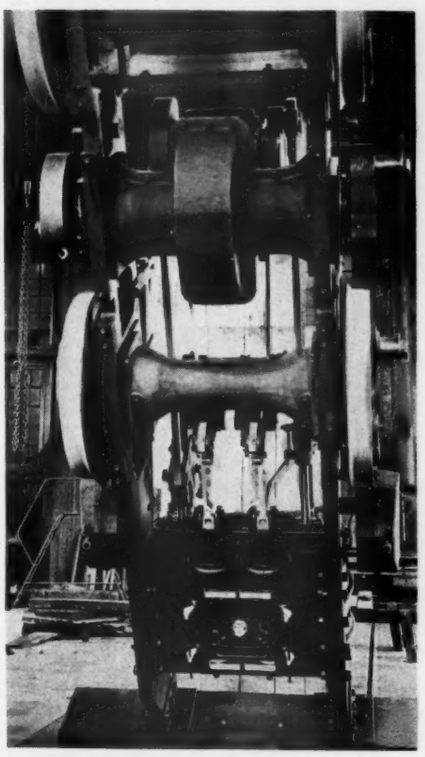
The locomotive has an overall length over bumpers of 26 ft. 0 in., 6 ft. 9 in. wheelbase, width 9 ft. 6 in., height 11 ft. 10 in., and operates on 56½ in. standard gauge track. The inside diameter of the tank, which is a welded unit built to meet A. S. M. E. requirements for unfired pressure vessels, is 76 in. All gears are ground after hardening and the operation is more quiet than that of an average automobile transmission. The engine takes its load smoothly and runs without "nosing" or "weaving" on the track, accelerating rapidly and being under exact control for spotting cars at all times. Patent applications have been filed to cover many of the new and novel features of this new unit.

New Goggles

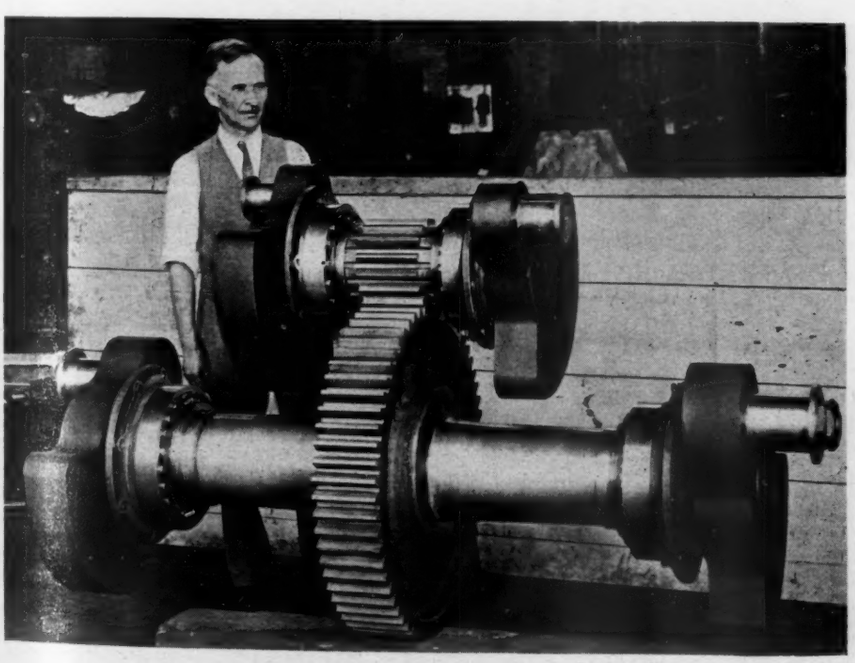
WILLSON PRODUCTS, INC., has put on a new style DC50 goggle for chippers, grinders and welders. This is, as the illustration shows, a cup goggle, has 50 mm. clear "Super-Tough" lenses next to the eyes and 50 mm. Willson weld lenses and clear cover lenses in a hinged frame. The goggle is used open for chipping and closed for welding. It is provided with ventilation, an adjustable leather nose bridge and elastic headband.

The manufacturer says: "The development of this new goggle is most important, not because it has a wide use but because its application is on extremely dangerous jobs; operations where, heretofore, two separate types of goggles were required and where the normal risk was multiplied by the necessity of frequently changing goggles. Many eyes have been lost or injured because workers did not make it a strict rule to lay down their tools, remove one goggle and put on another before resuming work in a welding and grinding job or any other of the various combinations requiring both types of eye protection."

Double-service goggles



Underframe of locomotive



Driving gears showing roller bearings

Gyratory Screen

BEARDSLEY & PIPER, Chicago, manufacturers of foundry equipment, announce a gyratory screen for which these special features are claimed: (1) They operate with a combination of circular, vertical oblique and forward and backward movement, best described as gyratory. (2) They have greater capacity per square foot of screen area. (3) They eliminate crushers and lump breakers. (4) No vibration is imparted to adjacent superstructure. (5) Minimum head room, length and width is required. (6) Operating mechanism is dust sealed. (7) Screens are easily and quickly changed. (8) Lubrication is simple. (9) No parts to wear or quickly break. (10) Only 1 hp. or less is required to drive them.

Simple gyratory screen

Rock Products News Briefs

Cement

Michigan State Cement Plant, Chelsea, Mich., is actually being dismantled after prolonged political controversy. The plant was purchased in 1923 at the instance of Governor Alex J. Groesbeck, who charged that cement manufacturers were holding up the price of the product that was being furnished for the State Highway Department's huge concrete road building program. The original cost was $500,000, and in succeeding years about $792,000 more was spent for new machinery and other improvements. Although operated mainly by convict labor, it was eventually discovered the state could buy its cement requirements for less than the cost of operation. In 1932, after the plant had been long idle, some inquisitive person discovered that salaries totaling $41,860 a year were being paid 19 employes who were doing nothing. Bids for the mill were received in August, 1933. The highest, $70,000, was rejected because it was not accompanied by a certified check. Other bids were reopened in June of this year, but most of them were from junk dealers. The highest bid was only $35,000, and as the state had a chance to sell the remaining clinker to a private cement plant for $20,000, Burnett J. Abbott, secretary of the administrative board, estimated that the state could obtain nearly $60,000 by salvaging the property itself. The state will remain in possession of 800 acres of land, and it has been suggested that the tract be converted into a state park.

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Kosmos Portland Cement Co., Kosmosdale, Ky.: The Louisville office of the Travelers Insurance Co. has won a decision in the Federal Court, involving one of the largest subrogation claims under liability coverage that has been before the courts in Kentucky for a long time. On August 3, 1929, an oil barge of the company blew up at the cement company's dock, resulting in deaths of seven men, including two employes of the Kleinsteuber Boiler Works, Louisville. The question came up as to whether these men were directly employed by the boiler company or the cement company, in that they were under direction of the cement company, which paid the boiler company for their services. The decision was that they were employes of the boiler company. However, as it was a marine accident, on a barge in the Ohio river, the case had to be handled under marine or longshoremen's compensation. The Federal District Court at Louisville awarded the estates of the two dead boiler workers judgment of $10,500 each against the boiler company. The Federal Appellate Court reversed the decision, on the grounds of negligence on the part of the cement company in the matter of failing to clean the barges properly. The Supreme Court refused to review the case, and the Federal District Court fell in line with the Appellate Court decision, with the result that the Travelers, which had taken subrogation rights from the boiler company when it adjusted one loss and started paying benefits on the other, will now recover the amounts paid out, costs, interest, etc., from the Kosmos Portland Cement Co.

Code Developments

Lime Industry: October 13 marked the end of a full year's operation under the code. The code authority has compiled a summary which states that only 23 formal trade practice complaints have been received during the past 12 months by the code authority or the national trade practice complaints committee. These cases are analyzed in the following table:

TRADE PRACTICE COMPLAINTS

	Total Number
Received	23
Rejected	2
Accepted	21
Withdrawn	5
Reinstated	1
For investigation and action	17
No violation found	4
Adjusted without formal action	4
Pending, Code Authority or National Trade Practice Complaints Committee	4
Referred to NRA	5
Pending further investigation	1
Withdrawn from NRA	1
Found guilty, Compliance Council	2
Adjusted, restitution of back wages and certificate of compliance	2
Now pending, Compliance Council	1

A majority of the complainants alleged violation of Article III, Section 3 (c) as to deviation from filed prices. A number of complaints, however, charged violation of the labor provisions relating to maximum hours and minimum wages. Alleged violations of Article IV, Unfair Methods of Competition, have pertained to such provisions as Section 2, Selling Below Cost, Section 7, Inducing Breach of Contract, Section 13, Consigned Goods, Section 17, Protected Contracts, Section 18, Duration of Agreements, and Section 22, Splitting of Commissions.

Two complaints were rejected because the evidence submitted showed at once, in one case, that no provision of the code had been violated and, in the other, that no violation had yet occurred.

Five complaints were withdrawn in addition to one case which was withdrawn after having been submitted to NRA. Withdrawals occurred usually because subsequent facts indicated that no violation had occurred, or that insufficient evidence was available to support charges of violation. One complaint withdrawn was reinstated pending further action upon approval of the new code.

There have been 17 complaints, therefore, to be investigated by the code authority and to receive further action. Of these, 4 were dismissed because no violation was found to have occurred, 2 of these cases having come before the code authority and two before the national trade practice complaints committee since the establishment of that agency.

Four complaints were adjusted without recourse to formal action either by NRA or the national trade practice complaints committee. In two cases the complaint was withdrawn after a short investigation and in two other charges were dropped because of promise of future compliance. The two cases withdrawn are in addition to the five previously enumerated.

Four complaints are now pending before the code authority or national trade practice complaints committee. Of these, 2 have to do with the proper method of filing prices on lime for special chemical use. One complaint is that which was reinstated after having been withdrawn, and one, only recently received, is now being investigated and will be brought before the national trade practice complaints committee at its next meeting.

Five cases have been submitted formally to NRA for action by the compliance division. Of these, one requires further investigation before coming before the compliance council. One complaint was withdrawn by the code authority when subsequent investigation showed clearly that the respondent was not subject to the code in respect to the original complaint. Two complaints have been acted upon by the NRA compliance council, and both respondents were found guilty as charged. Unofficial information is that each of these cases has now been satisfactorily adjusted, the respondents making restitution of back wages and signing certificates of future compliance. One case of a flagrant code violation is now before the compliance division of NRA and, as the docket of the council is only about two weeks ahead of hearings, this case should receive early consideration.

In addition to the complaints brought under the Lime Industry Code, against lime manufacturers, the code authority has been instrumental in having an investigation made of a manufacturer of a product competitive to lime who was under no code but who had signed the President's Reëmployment Agreement. This manufacturer was selling his product at a very low price and investigation showed that he was violating the terms of the PRA. A heavy restitution of back wages is being required.

The lime code authority concludes from the foregoing that it is apparent that com-

pliance has been very satisfactory in respect to the formal complaints which have been filed. No flagrant case of code violation has failed to receive corrective action where formal complaint has been made. Results have been somewhat slow, but it is believed that under the new regime at NRA the machinery of compliance will be greatly accelerated; it is obvious that no manufacturer can violate provisions of the code with continued impunity.

This analysis reveals that many complaints received either showed no clear violation or presented insufficient evidence. Furthermore, several complaints were apparently sent in too hastily, and some were based largely on hearsay. A formal complaint should always be considered with the same care as any other proceedings at law. Formal rules of procedure and forms upon which any trade practice complaint should be made, will be available soon to everyone. Forms and procedure were approved on October 1, 1934, by NRA contingent upon certain minor changes which must be officially approved by the code authority before distribution can be made to the industry.

Complaints committee members approved: B. L. McNulty, Marblehead Lime Co., Chicago, Ill.; J. M. Gager, Gager Lime Manufacturing Co., Chattanooga, Tenn.; J. M. Deely, Lee Lime Corp., Lee, Mass.; Reed C. Bye, Warner Co., Philadelphia, Penn.; G. J. Whelan, Kelly Island Lime & Transport Co, Cleveland, Ohio, and Colonel A. C. Voris, administration member of the code authority, U. S. War Department, Washington, D. C.

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Rock and Slag Wool Manufacturing Industry: Applied for approval of budget for the period August 1, 1934, to December 31, 1934, of $7,027.65, being ½ of 1% of the dollar volume of business done in the first six months of 1934 ($1,686,634.30), payable quarterly. Applied for exemption of Administrative Order No. X-36, whereby members of an organization whose principal line of business is embraced under another code are exempt from payment of dues. In this industry 80% of the total production is by manufacturers whose principal products come under other codes.

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Talc and Soapstone Industry: Applications of Georgia Talc Co., Asheville, N. C., and Cohutta Talc Co., Dalton, Ga., for exemption from the provisions of article IV, section 1, relating to minimum wages and asking reduction of wages of the Southern District to 27½ cents per hour underground and 22½ cents per hour overground denied.

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Sand-Lime Brick Industry: Termination of exemption granted in Administrative Order No. X-36, paragraph III, upon any member of this industry whose principal line of business is in some other trade/industry, so that such member is no longer exempted from paying his proportionate share of the costs of administering this code.

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Slate Industry: Following interpretation given in regard to increase of productive facilities:

FACTS—It appears that the Pitts Slate Corp. is enlarging its quarry by removing overburden of earth and material which does not contain any slate, and they contend, therefore, that this work is not quarrying slate. However, it further appears that the general understanding of the term "quarrying" by members of the Slate Industry Code Authority includes all the operations necessary to facilitate the removal of slate. The Pitts Slate Corp. has also contended that it is prospecting to discover a better grade of commercially produceable slate. It appears that such operations are commonly carried on by all members of the industry and are considered by them as part of the quarrying operations.

QUESTION—Is the Pitts Slate Corp. a member of the "Industry" insofar as the incidental work of expanding their quarry is concerned, taking into consideration the fact that they have in the past both quarried and sold slate, but at present are only selling what they have quarried in the past?

INTERPRETATION—The term "quarrying" includes all those operations carried on at the site for the purpose of facilitating or which do facilitate the removal of slate from a vein whose existence may be reasonably inferred from nearby quarries, outcrops of slate, or other available geological data and that the operations of the Pitts Slate Corp. are quarrying operations and that they are a member of the Industry.

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Soft Lime Rock Industry: Personnel of trade practice complaints committee approved: L. B. McLeod, McLeod Milling Co, Williston, Fla.; W. M. Palmer, Dixie Lime Products Co., Ocala, Fla., and Emmett Cleary, Williston Shell Rock Co., Newberry, Fla.

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Crushed Stone, Sand and Gravel and Slag Industries: Work was resumed recently by Edw. M. Rocho, Freeport, Ill., contractor, on the fourteen blocks of street paving in the city of Dixon, after a delay of two weeks caused by a technical code violation of the sand and gravel company that is furnishing the material for this improvement. Complaint was filed September 9 against the E. C. Risley Sand & Gravel Co., Dixon, for failure to file prices five days before the date of the letting. After many code conferences the matter was finally brought to the attention of the NRA code compliance administration of the state of Illinois, who called in the producer, the mayor of Dixon, the contractor and the district committee of the sand and gravel industry. The case was heard in Chicago by Mr. Cook, acting administrator, and Mr. Nelson, field adjuster, who after hearing the facts of the case interpreted the provisions of the code to those present in a manner which made an adjustment of the complaint possible and an order was issued for the work to start immediately.

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Approval of memberships and plans of procedure of trade practice complaints organizations: *REGION No.* 5: Geo. D. Lott, Palmetto Quarries Co., Columbia, S. C.; G. A. Austin, Consolidated Quarries Corp., Atlanta, Ga.; C. E. Ireland, Birmingham Slag Corp., Birmingham, Ala.; Geo. B. Denham, Concrete Gravel Co., Hattiesburg, Miss.; and C. F. Mullen, Georgia Gravel Co., Columbus, Ga. *REGION No.* 14: F. P. Spratlen, Jr., J. W. Brannan Sand & Gravel Co., Denver, Colo.; G. W. Hamilton, Hamilton & Gleason Co., Denver, Colo.; Arthur L. Allen, Arthur & Allen, Pueblo, Colo.; and M. W. Woodward, Woodward Construction Co., Rock Springs, Wyo.

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CONNECTICUT made a permissive territory. The order said the limitation is "on an experimental and tentative basis for a trial period of 120 days from the effective date of this order." The order is effective October 7. The 120-day period may be extended by the administration.

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Uniform terms of sales and credit practices have been approved for Region No. 4, Maryland, District of Columbia, Virginia and West Virginia districts. In accordance with code provisions, these four divisions comprising Region No. 4, had asked NRA approval of their respective rules, all of which differ slightly in respect to specific terms and practices. Rules for both West Virginia and Maryland districts, as approved, include an open-price filing system.

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Ready-Mixed Concrete Industry: Milwaukee, Wis., marketing area committee approved. Roy Bartos, Central Ready Mixed Concrete Co., Milwaukee; W. Manegold, Manegold Stone Co., Milwaukee; Tam D. Francey, Certified Concrete Co., Wauwatosa, Wis., and J. K. Jensen, Janesville Sand & Gravel Co., Milwaukee.

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For the Detroit (Mich.) area: Gage W. Cooper, Cooper Supply Co.; Matthew Gilmartin, Julius Porath & Sons; A. J. O'Connor, Koenig Coal & Supply Co.; E. J. Tisdelle, Parker Bros.; J. K. Wing, Detroit Transit Mixed Concrete Co.; F. J. Knight, J. A. M. Products Co.; E. B. Metzen, E. B. Metzen Co., all of Detroit, and A. J. Boice, Boice Bros., Pontiac, Mich.

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For the Tulsa (Okla.) area: Jack McMichael, McMichael Bros.; James B. Grey, Standard Roofing and Material Co., and J. T. Lynch, Builders' Concrete Co., all of Tulsa.

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Concrete Pipe Manufacturing Industry: Termination of exemption granted in Administrative Order X-36 ordered.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Pittsburgh, Pa.

Report of the Building Research Board for the Year 1933. A great deal of material of interest to many readers of Rock Products is to be found within its pages. It may be obtained from the British Library of Information, 270 Madison avenue, New York City. Some studies have been made of the durability of limestones in terms of the saturation coefficient, which is defined as the ratio of amount of water absorbed by simple soaking for a standard time and the accessible pore space. It is shown to have a wider significance than as mere criterion of frost resistance, for it also gives information about structural strength and resistance to weathering, which means much more than just frost resistance. They have found that the crystallization test (sodium sulfate), arbitrary as it is, has given useful information concerning the weathering qualities of building stones.

The Station seems to have acquired a rather poor opinion of stone preservatives; experience indicates an effective life of twelve to eighteen months and even hastening of decay in some cases. For bonding rubber flooring to concrete, asphalt emulsion has not given as good service as hot bitumen.

A study has been completed covering the phase relationships of the system, CaO-$2CaO.SiO_2$ - $5CaO.Al_2O_3$ - $4CaO.Al_2O_3.Fe_2O_3$ which includes portland cements. When aluminous cement hardens at high temperatures, much of its strength is lost due to the formation of cubical crystals. It was found that carbonation of mortars usually contributed to their strength and may be an important factor in the long time gain in strengths often reported. Some interesting results have been obtained with pozzuolana concretes prepared from certain calcined clays and spent shales. Some of the strengths compare favorably with straight portland cement concretes. Little difference could be detected in permeability, but in heat evolution and in resistance to chemical corrosion the pozzuolanas were better. When tested for volume changes on bases of varying porosities, it was noted that the results obtained with mortars from which no water had been removed were often quite different than where suction, especially with working of the mortar, had taken place. On retempering mortar after about six hours by working, but without added water, a slight reduction in drying shrinkage was observed, but a marked decrease in carbonate shrinkage. If water was added, however, a marked increase in these shrinkages was found. The carbonate shrinkage occurs at the surface and has often resulted in crazing of cement products.

The British Keen's cement industry produces a great variety of products, indicating the need for adequate specifications. A study of slates by alternate wetting and drying has been made and in many of the poor ones rust development or growth of calcium sulfate crystals between the laminas has been observed.

Expanded slate aggregate was prepared in an experimental rotary kiln and made into partition slabs, using a 1:11 mix by volume and compared with similar units made from pumice and from breeze. In transverse strength, density, crushing strength, water absorption, thermal conductivity and soluble salt content, all three kinds of units gave essentially similar results, but in the change of volume on wetting and drying the expanded slate gave results far superior to the other two.

Calculations made from the tensile strength of concrete corrected for the creepage indicated that a given specimen of concrete with ends constrained against movement should crack in about five weeks, while the actual test required a few more days before the crack could be detected. Rapid hardening cements produce concrete of less creepage tendency so that more tendency occurs for cracking. The reduction in creepage accompanies an increase in strength. Measurement of rise in temperature in certain dams built with an early high strength cement showed slower heat evolution at early stages as compared with a standard cement. One normal portland cement produced a more rapid temperature rise than a certain so-called rapid hardening cement, and its strength was also greater. After studying winter concreting, the recommendation was made that the concrete, when placed, should not be allowed to fall below 40 deg. F. and, after placing, it should not fall below 32 deg. F. for the first 72 hours. An aluminous cement was found to give very excellent results in cold weather.

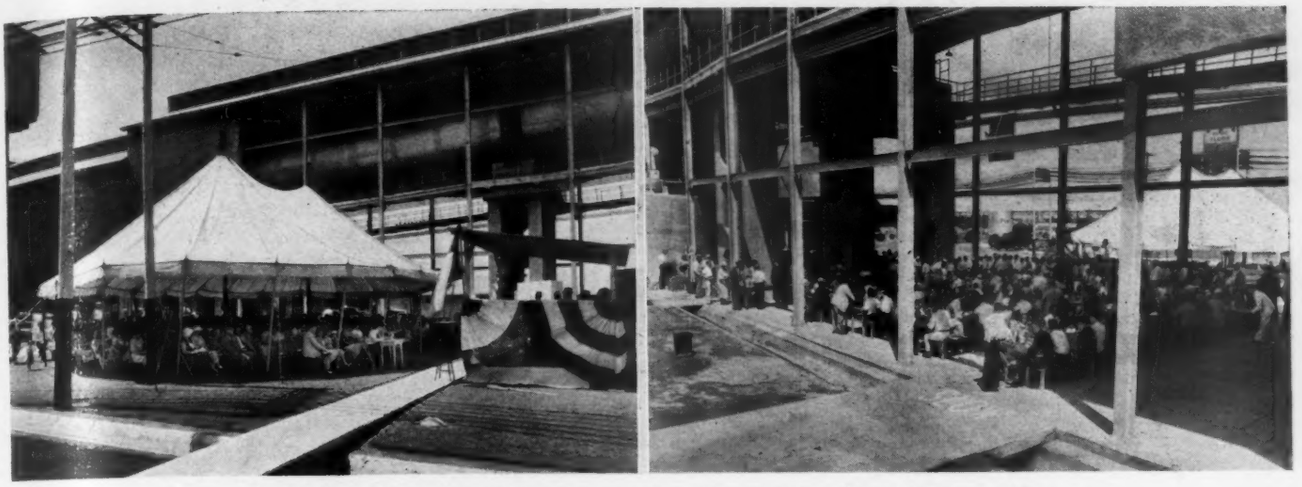
The Formation of High-Chloride Oxychlorides Containing Calcium Chlorides. The unsoundness of concretes containing calcium chlorides under certain conditions has been studied by P. Mecke and he has reached the conclusion that a chloroaluminate is not formed. Instead, a tricalcium oxychloride, $3CaO.CaCl_2$ is formed and changed to the monocalcium compound, $CaO.CaCl_2$, with separation of lime by the action of more chloride. The product is crystalline, causing pressure and disintegration. With stronium hydroxide, only one oxychloride was found, $SrO.SrCl_2$. *Tonindustrie Zeitung* (1934) 58, No. 57, p. 689; No. 58, p. 700; No. 59, p. 713.

Setting Free of Lime on Reheating Portland Cement Clinker and Its Compounds. This reaction, first reported here by S. L. Meyers (Rock Products, 1930, No. 8, p. 78) and confirmed by E. T. Carlson (Rock Products, 1931, No. 25, p. 52) and others, has been repeated and extended to the chief compounds found in portland cement clinker by Shoichiro Nagai and Keiichi Murakami. They call attention to an earlier article by Haruhiko Cho [*Journal Society of Chemical Industry*, Japan (1929) 32, p. 570.] In this paper it is shown that the lime seems all to come from the decomposition of tricalcium silicate, which reaction is accelerated by mixing in gypsum, dicalcium ferrite, calcium fluoride, etc. Compounds, such as calcium phosphate, dicalcium silicate, tricalcium aluminate, magnesia, etc., have no accelerating effect. Tricalcium aluminate, dicalcium silicate and dicalcium ferrite do not seem to lose lime on reheating, although gypsum sometimes aids the first to decompose. When cement, mixed with gypsum, is heated, often the lime set free is greater than the amount of tri-silicate present, indicating decomposition of the tri-aluminate. (Reprint.)

The Hardening and Corrosion of Cement, VIII. The Effect of the Temperature of the Salt Solutions. D. Karl E. Dorsch continues the discussion of this interesting subject by considering the temperature factor. The chemical attack of corrosive solutions on mortar specimens is speeded. Solubility of calcium sulfate formed increased diffusion rates enter in.

Following the suggestion of Anderegg that an addition of sulfate to the setting cement might be expected to increase its resistance to the distending sulfoaluminate formation, a series of experiments were carried out with specimens of ordinary portland cement mortar placed in corrosive solutions after various periods of initial storage. It was found that those briquettes which had been stored the shortest time in water withstood the corrosive action best. The explanation seems to be that the system is still soft enough to accommodate itself to a considerable extent to the distorting influences of the volume increase. At this stage of the game, also, the expansion might be expected to stop up the pore spaces to a considerable extent, thereby reducing the opportunity for the corrosive solution to contact the aluminate. Specimens which had been given a combined storage also stood up pretty well. Under these conditions, the hardened cement gel seems to be able to resist fairly well the distending forces set free. *Cement and Cement Manufacture* (1934), 7. No 4, p. 45.

Cement Plants Dedicate Trophies



Dedication of P.C.A. trophy at Lone Star Cement Co. plant, Houston, Tex.

AUGUST AND SEPTEMBER have proven popular months for cement plant safety celebrations.

Howes Cave

On August 17, the Howes Cave (New York) plant of the North American Cement Corp. celebrated the reaward of its Portland Cement Association safety trophy as a result of three successive calendar years of operation without loss of time by any employe due to accident. With continued accident-free record, this plant will be eligible shortly to membership in the famous 1000 Day Club. Plant employes with a large party of neighbors and friends and a number of special guests of the occasion, were on hand at the plant baseball park for the formal ceremonies. Addresses were made by S. H. Rhodes, plant safety chairman; A. M. Tyree, safety director; John Daly, New York State Labor Department; Hon. F. Walter Bliss, Justice, Appellate Division, State Supreme Court. Harry Greenwald, plant chemist, acted as master of ceremonies.

After the program, refreshments were served to the several hundred persons present; there was a game of baseball between the plant team and a prominent team from one of the nearby villages. On the preceding evening, employes and their families attended a dancing party at Odd Fellows' Hall in Central Bridge, also held in honor of the safe record.

Bonner Springs

Fittingly commemorating the attainment of a thousand days without lost time accident, employes and friends of the Lone Star Cement Co., Bonner Springs, Kan., gathered on August 18, to rededicate their association safety trophy, won again in 1933. A crowd of over 900 people attended.

A speakers' platform and seats for the guests had been placed under the shade trees at the east side of the office lawn, where the following program was given: Song, "America"; introduction and welcome, J. A. Lehaney, vice-president; rededication, Mark H. Small, district engineer, Portland Cement Association; acceptance, John O'Callaghan, superintendent; "Safety to the Community," Lee E. Weeks; "Accident Prevention," Frank Lynch of Kansas City Safety Council; addresses by Senator J. S. McDonald, M. L. Briedenthal, and Baxter D. McClain of the Lone Star company. This was followed by community singing under the direction of Mr. Small, and music by the Bonner Springs band. Following the talk, refreshments of barbecue, salad, ice cream and drinks were served to all.

St. Mary's

Dedication of a new Portland Cement Association trophy at the plant of St. Mary's Cement Co., St. Mary's, Ont., on September 3, provided a real red letter day in that vicinity. More than 2500 persons attended the ceremonies and the field program which followed.

In his opening remarks, John Lind, general manager of the company, said: "I have an announcement to make. Starting on September 1, 1934, there will be an increase in pay of 5% to all our employes. Business is better and I think and hope it will continue to pick up, so that other increases may soon come. We have been going through rather trying times the last three years for us all and I hope and trust that the worst is past, never to return."

Seated on the platform along with Mr. Lind were Mayor Harstone, Chairman Frank May of the Public Utilities Commission, F. G. Sanderson, member of Parliament; Charles Richardson, Angus Dickson, M. L. A., Chief of Police William Moyes and others.

There were present the St. Mary's Brass Band, reorganized for the occasion, and seven Scotch pipers who added greatly to the interest of the occasion. Norman Johnston, superintendent, unveiled the trophy.

After the serving of refreshments the most popular event was the tug-of-war. Four teams of heavy-pullers from different departments of the plant took part. In the preliminary tugs Archie Black's mill gang pulled Dave Oliver's Dry End team over the line. Then Jim Ross' clay pit team tried conclusions with Jack Ellis' quarry men. The finals were pulled between the mill gang and the clay pitters, the former getting the decision.

Houston

The Houston plant of the Lone Star Cement Co., Texas, which won its Portland Cement Association Trophy with a perfect safety record in 1930 and matched that performance in 1932 and 1933, rededicated its trophy September 15. The program was as follows: Music, Milby High School Orchestra, "America"; introduction and welcome, Wm. Moeller, general superintendent; presentation of trophy, T. B. Warden, district engineer, Portland Cement Association; acceptance, L. J. Wheeler, superintendent; address: "Safety to the Community," C. W. McPhail, president Houston Safety Association; "Good Will," L. R. Ferguson, vice-president, Lone Star Cement Co., Texas; address, Oscar F. Holcombe, mayor of Houston; music, "Star Spangled Banner." The master of ceremonies was Wm. Moeller, general superintendent; musical director, J. D. Moncrief.

L. R. Ferguson said in part:

I want to talk a little while to our employes. You guests can listen in. I want to tell you men how proud I am personally to be an employe of a company that has the character of men working for it that this Houston plant has. I mean that very sincerely. Not only safety work but all the work we do depends entirely for its success on coöperative effort. We have had in this plant for years, in fact ever since it was built, the kind of happy family spirit which leads to success not only in safety work—that must come, we must have coöperation in that cause of course—but we possess that

friendly spirit of helpfulness that will enable us to attain any reasonable goal. We have attained success in building up this plant from a very small beginning to one of the greatest plants in the country. In some ways it is an outstanding plant because in the kilns that we have here we possess the largest pieces of machinery of their kind in this country.

This plant was started about twenty years ago and Mr. Moeller was the actual erecting superintendent in charge of the construction of the plant, and let me tell you, twenty or twenty-two years ago Houston was not the large city it is today. Houston was at that time just beginning to show what the future held for it. When we built this plant we had faith in Houston and believed it was going to be a great community and that the city warranted the erection of a cement plant which would serve its needs; that the city would grow and that as it grew we would find this investment a profitable one. It took a long while to reach that goal; but we did for a while and we will come again to the point where we can make this plant profitable.

It is the constant endeavor of the management of the International Cement Corp. in all its plants to make cement mills places where men can work safely and be happy in their work, and when they go home at night they can be proud that they are connected with the company.

After luncheon there was a splendid program of field events occupying most of the afternoon.

Ash Grove

With a record of three consecutive accident-free years to its credit, the Louisville, Neb., plant of the Ash Grove Lime and Portland Cement Co. rededicated its Association Trophy on September 22, with an attendance of over 900 employes, friends and guests. Practically the entire town of Louisville turned out for the occasion.

After the following program, refreshments and entertainment were provided in the plant park: Chairman, A. K. Frolich, superintendent; song, "America"; address of welcome, A. K. Frolich; rededication of trophy, H. J. Young, acting district engineer, Portland Cement Association; unveiling of trophy, Helen Ann Doan, Marjorie Dean; acceptance, A. Lundteigen, Jr., chairman, plant accident prevention committee; music, Louisville Band; brief remarks by J. R. Noyes, plant employe; E. E. Matthews, labor and compensation commissioner; A. B. Sunderland, secretary; J. A. Rockwell, vice-president; F. C. Lynch, director Kansas City Safety Council; song, "Star Spangled Banner."

Independence

One of the most interesting and impressive safety trophy ceremonies of the year was held at the Universal Atlas Cement Company's plant at Independence, Kan., on September 28. The affair marked the rededication of the plant's association trophy for the third consecutive year and celebrated a safe record of 1165 days. Unfortunately that record was marred by an accident during the present year, but the plant safety organization is up and coming and already at work to create a new record.

The program of ceremonies included an address of welcome by C. M. Carman, superintendent; presentation of trophy, Mark Small, district engineer, Portland Cement Association; acceptance, Ray L. Olney, chairman, employes' representative committee; appreciation of the management, Paul C. Van Zandt, vice-president; address, Hon. Arthur Capper, United States Senator, Kansas.

Immediately following the conclusion of this program refreshments were served on the lands surrounding the plant property, after which guides were on hand to conduct visitors through the plant.

Mineral Aggregates Conventions to Be in Chicago

THE CONCURRENT CONVENTIONS of the National Crushed Stone Association, the National Sand and Gravel Association and the National Slag Association, will be held at the Palmer House, Chicago, Ill., the week beginning Sunday, January 27, 1935.

Meetings of the three boards of directors will be held on the 27th, and a program for the remainder of the week has been worked out jointly by them and the Code Authority.

Crushed Stone

Western Limestone Products Co., Omaha, Neb., is the first rock products concern, so far as known, to make application to the Federal Trade Commission for permission to sell securities under the new Securities Act of the recent congress. Its application shows that it was incorporated January 30, 1934, to process limestone for building, road construction and other uses; now proposing, under a plan of readjustment or reorganization, to issue $94,850 first mortgage bonds covering the company's entire property, and 19,691 shares of $5 par value common stock, of which 5691 shares, together with the bonds, are to be issued in exchange for certificates of deposit of bonds of the predecessor company, which had defaulted in certain payments, while 14,000 shares are to be issued under an escrow agreement. Among officers of the reorganized company are: Harry E. Schellberg, president and treasurer, and M. M. Myers, secretary, both of Omaha.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for September, 1934, are announced by the Portland Cement Association as follows:

	Sq. yd. awarded during September, 1934	Sq. yd. awarded to date, Oct. 1, 1934
Roads	3,491,132	19,007,025
Streets	1,094,244	10,993,427
Alleys	14,248	105,511
	4,599,624	30,105,963

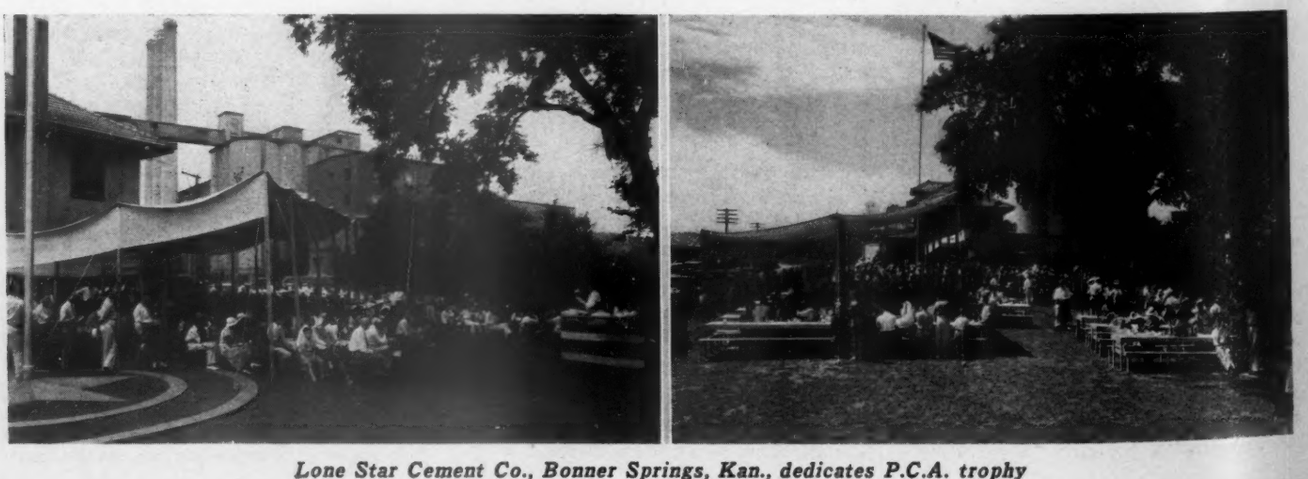
Rock Phosphate

International Agricultural Corp., Mt. Pleasant, Tenn., is reported to have reopened its mines and plants after a shut-down of nearly a year.

◆ ◆ ◆

Cement Products

James Walls, Ada, Ohio, has established a plant on East Buckeye Ave. to manufacture all-purpose concrete building blocks.



Lone Star Cement Co., Bonner Springs, Kan., dedicates P.C.A. trophy

Cement Section Has Successful Meeting at National Safety Congress

THE CEMENT SECTION of the National Safety Council held one of the best meetings of its existence in connection with the National Safety Congress in Cleveland, October 2, 3 and 4. Not only in point of attendance, but also in interest and the quality of the program material, it was an exceptional meeting.

Laying aside a precedent of several years, the Section reëlected as its general chairman, J. B. Zook, chief engineer of the Great Lakes Portland Cement Corp., Buffalo. The officers to serve with Mr. Zook during the company year are as follows: Vice-Chairman, W. W. Hamilton, Alpha Portland Cement Co., Easton, Penn.; secretary, A. J. R. Curtis, Portland Cement Association, Chicago, Ill.; news letter editor, Jack Dempster, Canada Cement Co., Ltd., Pt. Colborne, Ont.; engineering committee chairman, Frederick B. Hunt, Nazareth Portland Cement Co., Nazareth, Penn.; membership committee chairman, H. A. Reninger, Lehigh Portland Cement Co., Allentown, Penn.; post committee chairman, M. P. Greer, Marquette Cement Manufacturing Co., Cape Girardeau, Mo.; program committee chairman, D. B. Coleman, Missouri Portland Cement Co., St. Louis, Mo.

The above, with the following, constitute the executive committee: R. B. Fortuin, Pennsylvania-Dixie Cement Corp., Nazareth, Penn.; E. Posselt, International Cement Corp., New York, N. Y.; C. E. Ralston, Pittsburgh Plate Glass Co. (Columbia Cement Division), Pittsburgh, Penn.; F. E. Town, Manitowoc Portland Cement Co., Manitowoc, Wis.; H. Vanderwerp, Medusa Portland Cement Co., Cleveland, Ohio.

In opening the meeting, Chairman Zook presented as his annual report a paper entitled, "Our Work—Today and Tomorrow." After his opening remarks, Mr. Zook said in part:

"I am not going to quote any statistics, but I do say that if the entire cement industry will look at and take to heart the record of the year 1933, as shown in the table of accident experience compiled by the Portland Cement Association, we can see that there is something seriously wrong. Generally speaking, the year 1934 promises to show even worse than 1933. What is the answer? What are we going to do about it? Our laurel wreath has faded; it's about time we went back to work."

The annual report of the secretary, A. J. R. Curtis, was then presented in a paper entitled, "Analysis of Accidents in the Cement Industry," in which he emphasized that the industry has been slipping in the record it had made prior to 1933. He then analyzed some of the reasons, which appear to be flagging interest and lack of adequate supervision, and he outlined a procedure to follow to check up safety work to find these loopholes.

How to Investigate, Report, and Capitalize Accidents

O. E. Wishman, safety engineer, Lawrence Portland Cement Co., Thomaston, Me., and M. P. Greer, safety engineer, Marquette Cement Manufacturing Co., at Cape Girardeau, Mo., in two papers described their methods of driving home the lesson of accidents. Mr. Wishman, in conclusion, said: "There are a multitude of ways to utilize misfortunes (to prevent others), but the important thing I want to emphasize is to: *Do it quickly, completely and in a fashion designed to burn an enduring imprint on the memories of all.*"

Mr. Greer pointed out that while most investigations in the past were confined to serious accidents, today all were agreed less serious accidents, or merely accidents that might produce serious consequences, were just as worthy of thorough investigation as a measure of prevention.

Uses Movies

W. J. Worthy, superintendent, Medusa Portland Cement Co., Toledo, Ohio, made a thorough presentation of the subject, "Safetyizing Transportation in Cement Mills and Quarries," and illustrated his paper with 600 ft. of moving picture film which he had prepared for this occasion.

Joint Sessions With Quarry Group

Three papers of much practical value were read at the first of two joint sessions of the cement and quarry groups. These were: "The Dust Hazards in Industry," by Dr. R. R. Sayers, medical officer in charge, U. S. Public Health Service, Washington, D. C.; "The Foreman's Duties and Responsibilities in Preventing Accidents," by Glen L. Gardner, editor-in-chief, National Foreman's Institute, New York City; and "The Value of Competent First Aid," by Dr. W. J. Fenton, American National Red Cross, Washington, D. C.

Falls Cause Most Accidents

At the second session, W. P. Rice, superintendent, Crescent Portland Cement Co., Wampum, Penn., presented a paper, "Preventing Falls of Persons in the Cement Industry," in which he emphasized the importance of falls, pointing out that approximately one-half of injuries occurring in industry as well as in public places were due to falls and that from a total of 8 fatal accidents in the cement industry during 1933, 4 of these were due to falls, either of persons or objects. He gave further interesting statistical data based on analysis of the 1933 cement mill accidents to emphasize the fact that this industry must actively campaign against falls as the cause of many of our accidents.

Hand Tool Accidents

W. T. Groner, superintendent, Southwestern Portland Coment Co., Osborne, Ohio, presented a paper, "Hand Tool Accidents and Their Prevention," prefacing his remarks with an interesting review of the evolution of hand tools from the time of prehistoric man. He then quoted statistics from the records of the Ohio Industrial Commission and the Department of Labor of New York State which proved that the improper use and care of hand tools was an extremely important cause of accidents. From an analysis of 100 lost-time accidents from hand tools, it was found that the employer was responsible for 46 cases; the worker for 34, and 20 to joint responsibility of employer and worker.

Employes' Attitude

Following Mr. Groner's paper, Chairman Zook opened the meeting to a round table discussion and suggested the question, "What Effect on Employes' Attitude Do the Present Necessary Economy Measures Have, Particularly Relating to Company Loyalty and Safety?"

It is the general feeling that the employer's attitude is of extreme importance and that sincerity and fairness will always reflect back on the management. Comment was made on the necessity of proper individual training in the simplest details and technique of every job, and the fact was stressed that this training program must be carried to what would appear to be extremes if control of accidents is to be hoped for.

Officers of Quarry Section

The following officers were elected at the Quarry Section meeting: General chairman, William H. Baker, J. E. Baker Co. York, Penn.; vice-chairman, William E. Hilliard, New Haven Trap Rock Co., New Haven, Conn.; poster committee chairman, H. F. Yotter, General Crushed Stone Co., Easton, Penn.; publicity committee chairman, J. R. Boyd, National Crushed Stone Association, Washington, D. C.; statistics committee chairman, W. W. Adams, U. S. Bureau of Mines, Washington, D. C.; members at large of the executive committee, V. P. Ahearn, National Sand and Gravel Association, Washington, D. C.; Norman G. Hough, the National Lime Association, Washington, D. C.; O. M. Graves, the General Crushed Stone Co., Easton, Penn.; A. L. Worthen, the Connecticut Quarries Co., Inc., New Haven, Conn.

THE INDUSTRY

New Incorporations

North Providence Sand and Gravel Corp., Providence, R. I.; sand and gravel; capital, $1500, divided into 15 shares common at $100 each. Incorporators are Ernesto Di Biasio, Renaldo Di Biasio and John Skouras.

Mountain Sand and Gravel Co., Inc., Great Barrington, Mass.; capital $25,000. Incorporators are Robert K. Wheeler, Henry P. Tobey and James F. Watson.

City Brick and Sand Co., Inc., Kings, N. Y.; building materials; 200 shares, no par value. Incorporators are Louis Goldsmith, 617 Rutland Rd., Brooklyn, N. Y., Wm. Brown and Samuel Brown.

Concrete Products Corp., Seattle, Wash.; manufacturing pipe from cement or concrete; $40,000. Incorporators are Talbot Campbell, W. Harold Hutchinson and D. E. Fitzgerald.

Universal Insulation Co. is the new name of the National Vermiculite Products Corp. Correspondent is John H. Bishop, Bishop & Burdette, Board of Trade Bldg., Chicago, Ill.

Builders Sand Co., Wichita, Kan.; authorized capital $10,000.

The France Slag Co., Toledo, Ohio; 250 shares, no par value. Incorporators are C. V. Wolfe, R. H. Rogers and A. C. Ehrenfried.

The Pine Mountain Sand and Gravel Co., Whitesburg, Ky.; $10,000. Incorporators are Archie V. Sergent, Marie L. Sergent, Nellie Sergent, Gordon R. Lewis, James P. Lewis and Carroll Lewis.

Geo. M. Pendergast and Co., Inc., Milwaukee, Wis.; to deal in sands, clays, etc.; 400 shares at $100 each. Incorporators are O. M. and Geo. M. Pendergast and Florence Gnatzig. Attorney is Harvey R. Habeck, 722 Bankers Bldg., Milwaukee, Wis.

Leesburg Lime and Fuel Corp., Leesburg, Va.; capital $15,000. Incorporator, T. Frank Osburn.

West Virginia Lime Corp., Charlestown, W. Va.; capital $10,000. Incorporators, S. G. Proffit, Floyd. Va., and Paul H. Jamison, Charlestown, W. Va.

Personals

Roswell F. Heth of Universal Atlas Cement Corp. recently was presented with a 25-year silver service medal by his company.

Edwin Tomlin, managing director of the British Columbia Cement Co., Victoria, B. C., returned recently from a four months' trip to Europe. He is quoted by a local newspaper as follows: "Conditions are wonderful in Great Britain. We found a great change from the conditions of ten years ago when I made my last visit. Everywhere this time we saw new buildings and factories. The feeling of the people there now is splendid. They are cheerful and optimistic, and we found nobody grouching or complaining."

A. W. Heyman, research chemist for Universal Atlas Cement Co., recently addressed a meeting in Hudson, N. Y., on "The History of the Portland Cement Industry."

Charles L. Hogan, president of International Cement Co., New York City, recently returned to New York from a business trip to South America.

Robert B. Dickinson, formerly vice-president and general manager of the Marquette Cement Manufacturing Co., Chicago, Ill., is now associated with the Alpha Cement Co., Ltd., London, England, of which Albert Y. Gowen, former vice-president of Lehigh Portland Cement Co., is managing director.

Louis J. Kempf, recently made secretary of the Travelers Insurance Co., Hartford, Conn., was once northern Illinois sales manager of the former Continental Portland Cement Co.

Roland E. Koepp, New Braunfels, Tex., announces that he is established as a lime plant engineer, specializing in the design, construction and supervision of lime, lime hydrating, and stone crushing plants. He is a graduate civil engineer and has had several years' experience in this line of work.

Obituaries

Frank T. Gucker, president of The John T. Dyer Quarry Co., Norristown, Penn., died October 6 at the age of 64. Mr. Gucker was one of the earliest members of the National Crushed Stone Association and for several years past had been treasurer and director. He was also prominent in the Pennsylvania Crushed Stone Association and was chairman of the NRA code committee for the Philadelphia district. He was prominent in church and charitable organizations and much beloved by all who knew him.

V. G. Griffard, 48, sand and gravel producer, Twin Falls, Idaho, died September 29.

Edwin C. Reeder, superintendent and general manager of the Hillside Fluorspar Co., Rosiclare, Ill., died August 23 at the Waupun, Wis., Hospital, as a result of an automobile accident. He was 53, a graduate of Michigan College of Mines, and had been employed in various mining capacities in British Colombia, Montana, and Utah before he came into the fluorspar industry 18 years ago.

Henry V. Wyckoff, former New Jersey sales manager for the Lawrence Portland Cement Co. of New York, died October 20 at his home in Elizabeth, N. J.

W. Earl Gardner, general traffic manager of the North American Cement Corp., died at his home in New York City September 15.

Cement

Signal Mountain Portland Cement Co., Chattanooga, Tenn., resumed operations about the middle of October to fill orders from the TVA.

Lehigh Portland Cement Co., Metaline Falls, Wash., resumed operations at 50% capacity October 1.

Pennsylvania-Dixie Cement Corp., Clinchfield, Ga., was host to a group of Macon business men in September.

Universal Atlas Cement Co., Duluth, Minn., closed its operating season September 15 for a period of approximately six months, according to local newspapers. Shipments will be made from stock.

Manitowoc Portland Cement Co., Manitowoc, Wis., closed its operating season October 1. Shipments from stock will continue.

Lehigh Portland Cement Co., Iola, Kan., resumed operations October 5 after a two-months' shutdown, during which improvements were made and new equipment added.

Monolith Portland Midwest Co., Laramie, Wyo., closed its operating season September 15, its usual closing date for the season. About fifteen men will be retained in the shipping and machinery repair departments, and shipments from stock will continue.

Superior Cement Co., Superior, Ohio, was one of the winners in the Ohio industrial commission's six months' mining safety contest, which ended recently. Awards were made by Governor White of Ohio at the National Safety Congress in Cleveland.

Sand and Gravel

The Board of Supervisors of Sioux Center, Iowa, has let contract to Van and Van of Hull, Iowa, for stripping a new gravel pit.

Gravel pit on the farm of Benjamin Buss near Freeport, Ill., has been reopened to obtain gravel for township roads.

The Iowa State Highway Commission is making arrangements to open a gravel pit on the north edge of Alton, Iowa.

Lime

Cowell Lime Works, Friday Harbor, Wash., resumed operations recently after being idle for a considerable time. Emmet Coghlan is manager.

Crushed Stone

Boyd County Fiscal Court, Catlettsburg, Ky., has purchased portable rock crusher for county highway work.

Quarry on J. C. Stahl estate near Middleburg, Penn., is operating to capacity.

A county rock crusher recently has been established on the Willis Duncan farm south of Dearborn, Mo.

Schroeder Stone Quarry near Montpelier, Iowa, has been reopened by C. C. Putnam of Bellevue, Iowa, to quarry 10,000 cu. yd. of rip-rap for U. S. government river revetment.

Adams County Limestone Co., Corning, Iowa, was awarded contract for crushed rock for surfacing Federal Highway 95 by the state highway department. The company is making plans to operate sixteen hours a day in two shifts of eight hours.

Acme Limestone Co., Alderson, W. Va., will erect a $10,000 administration and store building.

Lester Clevenger of Orrick, Mo., has leased the Stewart Quarry east of Amazonia for quarrying stone for U. S. Government contracts.

FERA has supplied funds to Brunswick, Mo., township authorities to operate a quarry using 50 men for fifteen hours a week each.

Limestone crushing for agricultural limestone, using FERA labor, is active in three quarries in Walworth county, Wis.

Kentucky state-operated rock quarry on the Edmonton-Tompkinsville road has been closed and equipment moved to Morgantown, Ky.

FERA is supplying funds for a quarry to be operated by Henry Vollmer, engineer of the Washington, Ia., relief committee.

FERA quarry operations in Henry County, Iowa, have been transferred from the quarry east of Salem, Iowa, to the quarry southwest of Mt. Pleasant.

Rock taken from the new quarry located near Aspinwall, Mo., will be used on the Missouri river project at Indian Cave.

Cement Products

American Cement and Tile Co., Wampum, Penn., has added 35 more employes to its payroll to take care of new large orders, making a total of 60.

Garland Block and Sand Co., Mantua, Ohio, has been foreclosed by the City Trust and Savings Bank for a judgment of $16,689.

Manufacturers

Patterson Foundry and Machine Co., East Liverpool, Ohio, announces that D. M. Wilhelm, former sales manager, has been elected secretary of the company. E. M. Underwood, former division sales manager at East Liverpool, has been appointed sales manager.

Productive Equipment Corp., Chicago, Ill., announces that Carl Foeller, formerly with the Niagara Roller Bearing Screen Co., has joined its Pittsburgh representatives, W. H. McKee, Inc.; Hyman Ledeen, western representative of Falk Corp., has been appointed representative in the states of California, Nevada, Utah, Colorado, New Mexico and Arizona, with offices in Los Angeles and San Francisco, Calif.; F. J. Ford Machinery Co. has been appointed representative in the states of Montana, Wyoming, Idaho, and the western parts of the Dakotas and Nebraska.

Baldwin Locomotive Works, Philadelphia, Penn., announces that Daniel B. Worth, chief engineer of the Whitcomb Locomotive Co., Rochelle, Ill., has joined its engineering department at Philadelphia, where he will be identified with the engineering of both Baldwin and Whitcomb electric and internal combustion locomotives. Edward P. Hachtel, production engineer of the Whitcomb Locomotive Co., will remain at Rochelle, Ill., in charge of inspection and to provide engineering contact between the Whitcomb shops and the Baldwin Locomotive Works, which owns the Whitcomb company.

Bucyrus-Erie Co., South Milwaukee, Wis., announces the appointment of Ray Corson-Elkins Co., Denver, Colo., as Loadmaster distributors for the state of Colorado; Irving G. King and Co., Los Angeles, Calif., Loadmaster distributors for the Los Angeles territory; and H. A. Stevenson, Detroit, Mich., Loadmaster distributor in the Detroit territory.

American Hoist and Derrick Co., St. Paul, Minn., announces the resignation of Frank J. Johnson, president, and the election of Frederic Crosby to succeed him. Mr. Johnson and Oliver Crosby founded the American Manufacturing Co. in 1882, which in 1892 was re-organized as the American Hoist and Derrick Co. The new president, Frederic Crosby, is the son of Oliver Crosby. Howard S. Johnson, son of Frank J. Johnson, is vice-president of the company, and Harold O. Washburn, former general superintendent, has been elected vice-president and treasurer to succeed Frederic Crosby.

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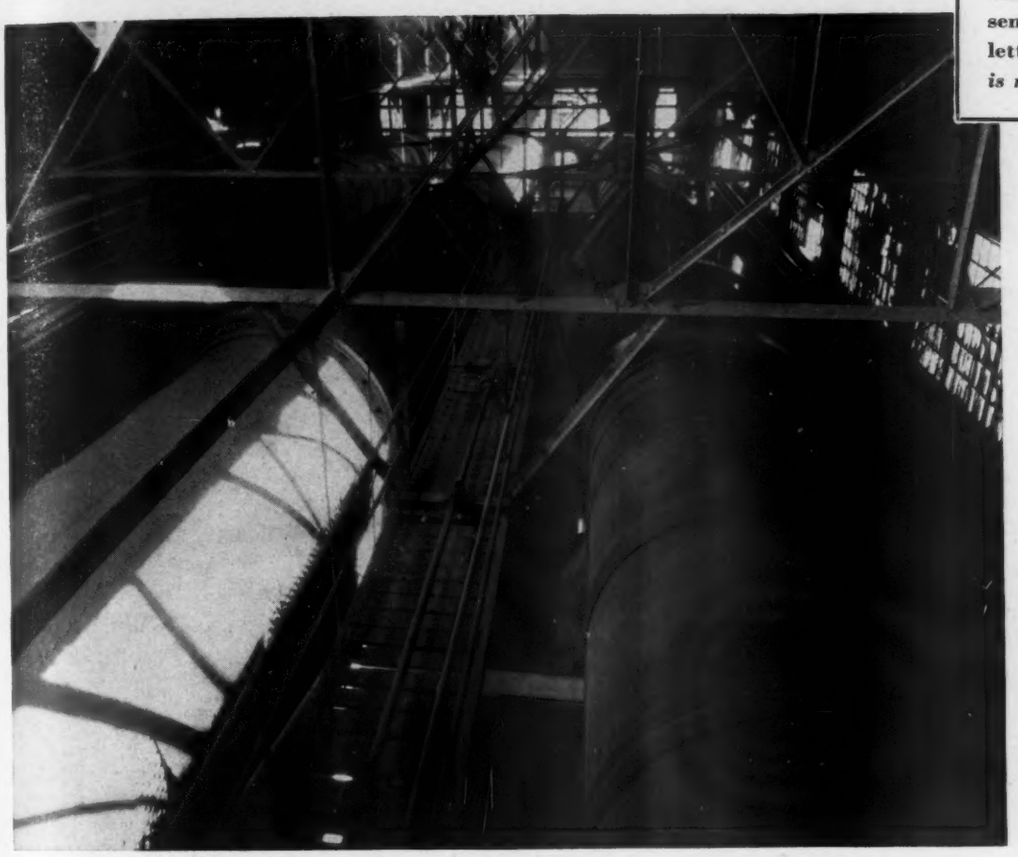

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Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

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Bucyrus-Erie Co.

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American Manganese Steel Co.
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Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Harnischfeger Corp.
Hayward Co.
Link-Belt Co.
Wellman Engineering Co.

Bulldozers
Blaw-Knox Co.
Koehring Company, Division of National Equipt. Corp.

Cableways
American Steel & Wire Co.
Link-Belt Co.
Macwhyte Company.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Hercules Powder Co.

Car Pullers
Link-Belt Co.
Robins Conveying Belt Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Cement Waterproofing
Wyodak Chemical Co.

Central Mixing Plants (Concrete)
Blaw-Knox Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.

Chutes for Minimizing Segregation
Robins Conveying Belt Co.

Clamshells
Bucyrus-Erie Co.

Classifiers
Link-Belt Co.

Clay Working Machinery
Bonnot Company.

Clips (Wire Rope)
American Steel & Wire Co.
Macwhyte Company.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Gardner-Denver Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressors (See Air Compressors

Conveyor Idlers and Rolls
Bartlett, C. O., & Snow Co.
Link-Belt Co.
Robins Conveying Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Fuller Company
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Link-Belt Co.

Couplings (Hose, Pipe, Etc.)
United States Rubber Co.

Cranes (Clamshell)
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.

Cranes (Crawler and Locomotive)
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.
Link-Belt Co.
Marion Steam Shovel Co.
Ohio Power Shovel Co.

Cranes (Excavator)
Koehring Company, Division of National Equipt. Corp.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.

Crusher Parts
American Manganese Steel Co.
Pennsylvania Crusher Co.

Crushers (Hammer)
Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc. (Jaw)
C. O. Bartlett & Snow Co.
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Crushers (Reduction)
Bonnot Co.

Crushers (Single Roll)
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Traylor Eng. & Mfg. Co.

Dedusters
Blaw-Knox Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Hercules Powder Co.

Diaphragms (Pump)
United States Rubber Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.
Marion Steam Shovel Co.

Dippers (Manganese Steel)
American Manganese Steel Co.

Ditchers
Bucyrus-Erie Co.
Harnischfeger Corp.
Marion Steam Shovel Co.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp. (Gasoline and Electric)
Link-Belt Co.
Marion Steam Shovel Co.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Marion Steam Shovel Co.
Ohio Power Shovel Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Marion Steam Shovel Co.

Dragline Excavators (Walking)
Bucyrus-Monighan Company

Dragshovels
Bucyrus-Erie Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Marion Steam Shovel Co.
Morris Machine Works

Dredging Sleeves
United States Rubber Co.

Drill Bits
Timken Roller Bearing Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drill Tools
Bucyrus-Erie Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills, Hammer (See Hammer Drills)

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Drills (Rock)
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company.
Combustion Engineering Corp.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.

Dumptors
Koehring Company, Division of National Equipt. Corp.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Co.

Dust Hoods and Helmets
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Dynamite
Hercules Powder Co.

Electric Cables and Wires
American Steel Wire Co.
John A. Roebling's Sons Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company.
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Company, Division National Equipt. Corp.

Excavators (Dragline)
Koehring Company, Division of National Equipt. Corp.

Explosives
Hercules Powder Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Fuller Co. (Cement and Pulverized Material)
Jeffrey Mfg. Co. (Pan and Tube)
Robins Conveying Belt Co.
Schaffer Poidometer Co. (Weighing)
Smith Engineering Works (Plate)

First Aid Equipment
Mine Safety Appliances Co.

Flights
Cross Engineering Co.

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
United States Rubber Co.

Gears and Pinions
Link-Belt Co.

Gelatine and Semi-Gelatine
(See Explosives)

Goggles (Safety)
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Grapples (Stone)
Blaw-Knox Co.
Hayward Co.

Grease
Gulf Refining Co.

Grinding Balls
Babcock & Wilcox Co.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Drills
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air, Drill, Pneumatic)
United States Rubber Co.

Hydrators
Blaw-Knox Co.

Hydraulic Cement Admixture
Wyodak Chemical Co.

Inhalators
Mine Safety Appliances Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bonnot Company.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lamp Guards
Flexible Steel Lacing Co.

Lamps (Electric Cap)
Mine Safety Appliances Co.

Lighters (Hot Wire for Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Co.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
United States Rubber Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Link-Belt Co.
Marion Steam Shovel Co.
Robins Conveying Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel)
Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Diesel-Electric)
Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Gas-Electric)
Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Steam, Gas and Electric)
Plymouth Locomotive Works (Gas)

Locomotives (Oil Electric)
Fate-Root-Heath Co.
Plymouth Locomotive Works

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining Co.

Lubricants (Wire Rope)
American Steel & Wire Co.
Macwhyte Company.

Machinery Guards
Harrington & King Perforating Co.
W. S. Tyler Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Mechanical Rubber Goods
United States Rubber Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
F. L. Smidth & Co.

Mixers (Concrete)
Koehring Company, Division of National Equipt. Corp.

Motor Trucks
General Motors Truck Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Oil Burners
Babcock & Wilcox Co.

Oils (Lubricating)
Gulf Refining Co.

Packing
United States Rubber Co.

Packings (Pump, Valve, Etc.)
United States Rubber Co.

Pavers (Concrete)
Koehring Company, Division of National Equipt. Corp.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plate (Double Corrugated)
Hendrick Mfg. Co.

Plates
Cross Engineering Co.

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Fuller Company
Link-Belt Co.
Robins Conveying Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Hercules Powder Co.

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizer Parts
American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company.
Dixie Machy. Mfg. Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Co.

Pumps (Cement)
Fuller Co.

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Morris Machine Works
A. R. Wilfley & Sons

Ready-Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.

Ready-Mixed Concrete Plants
Blaw-Knox Co.

Respirators
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Road Machinery
Blaw-Knox Co.
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.
Marion Steam Shovel Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
Timken Roller Bearing Co.

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Safety Equipment
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Blaw-Knox Co.
Harnischfeger Corp.
Link-Belt Co.

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Audubon Wire Cloth Corp.
Bartlett, C. O., & Snow Co.
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Jeffrey Mfg. Co.
Link-Belt Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Lewistown Fdy. & Mach. Co.

Scrubbers (Gyrating Tube)
W. S. Tyler Co.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.
Link-Belt Co.
Marion Steam Shovel Co.
Ohio Power Shovel Co.

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.

Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Sprockets and Chain
American Manganese Steel Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Tires and Tubes
United States Rubber Co.

Testing Sieves and Shakers
W. S. Tyler Co.

Tractors
Koehring Company, Division of National Equipt. Corp.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Company.
John A. Roebling's Sons Co
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trippers
Robins Conveying Belt Co.

Troughs
Cross Engineering Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.

Trucks and Trailers (See Motor Trucks)

Trucks (Mixing)
Blaw-Knox Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
United States Rubber Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Valves (Pump)
United States Rubber Co.

Vibrating Screens (See Screens, Vibrating)

Vibrators
W. S. Tyler Co.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Link-Belt Co.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Company, Division of National Equipt. Corp.

Weighing Equipment
Schaffer Poidometer Co.

Welding and Cutting Apparatus
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

Well Drills
Bucyrus-Erie Co.

Wheels (Car)
American Manganese Steel Co.

Wire (Rubber Insulated)
American Steel & Wire Co.
United States Rubber Co.

Wire Cloth
Audubon Wire Cloth Corp.
National Wire Cloth Co.
John A. Roebling's Sons Co.
W. S. Tyler Co.

Wire Rope
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Company.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Company.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

IT LOWERS COSTS!

The Walker takes the place of TWO machines; it strips as well as loads gravel—and at less cost per yard. It can follow an irregular bank, step around obstacles or walk directly away from a slide, without any lost time. As a gravel-digger, the Bucyrus-Monighan has great capacity.

Investigate the advantages of the Bucyrus-Monighan for economical stripping and gravel pit work. Bucyrus-Monighan Company, Chicago, Illinois.

BUCYRUS MONIGHAN

Walking Draglines 1 to 10 cubic yards

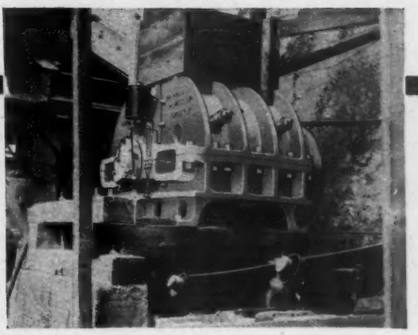
Sold by

BUCYRUS-ERIE CO.

South Milwaukee, Wis.

Representatives throughout the U.S.A. Branch Offices: Boston, New York, Philadelphia, Birmingham, Pittsburgh, Chicago, St. Louis, Kansas City, Dallas, San Francisco. Offices or Distributors throughout the world.

B-57



BONNOT

A better, more durable, more economical reduction Crusher recommended on the basis of proven results.

Produces correctly sized material at lower cost per ton as demanded in present-day specifications. A real crusher that returns real profits.

NOTE THESE FEATURES

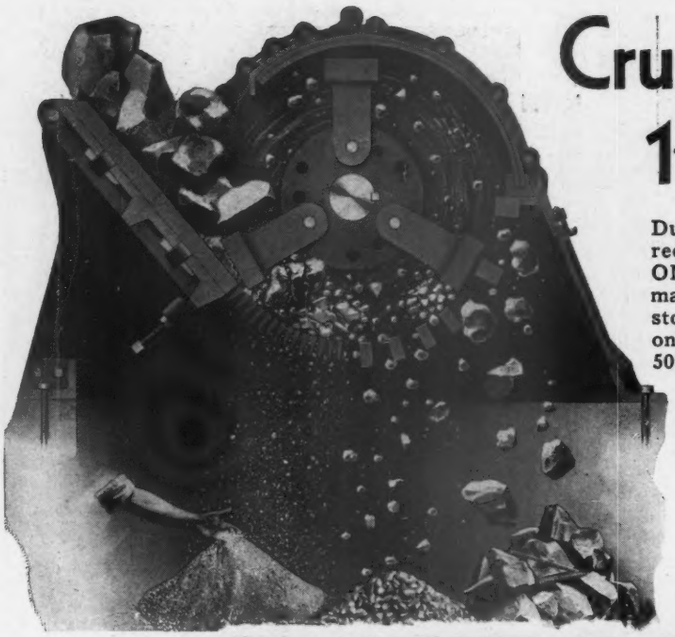
1. Utmost Simplicity
2. Unusual Ruggedness
3. Lowest Head Room
4. Superior Lubrication
5. Minimum Choking
6. Extra Long Life
7. Lowest Upkeep Costs
8. Safety Plus
9. Big Quality Tonnage
10. Real Power Savings

Crushers — Hammer Mills — Pulverizers — Cement Mill Machinery — Rotary Kilns — Disc Feeders, etc.

THE BONNOT CO.

CANTON, OHIO

— SINCE 1891 —



Crushes 36" Rock to 1¼" in One Operation

Due to their ability to handle power shovel loaded rock and reduce to commercial sizes in ONE OPERATION WITH ONE CRUSHER, Williams Hammer Crushers have shown remarkable savings in many quarries. By handling the large stone much sledging and secondary blasting is avoided. As only one crusher is required there is a saving in investment of 50% to 75% as you also save in smaller buildings, fewer foundations, conveyors, drives and motors. A cubular product free from slivers and slabs is another Williams advantage. Let us tell you about a Williams for your work. A size for every job. Capacities 3 to 300 tons per hour.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

Chicago	New York	San Francisco
37 W. Van Buren St.	15 Park Row	326 Rialto Bldg.

WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. THE TRADE MARK REG. U.S. PAT. OFF.

Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

PATENT CRUSHERS GRINDERS SHREDDERS

SCREENS of Perforated Metal

For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

The Harrington & King PERFORATING CO.

5650 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

WHAT PRICE GADGETS?

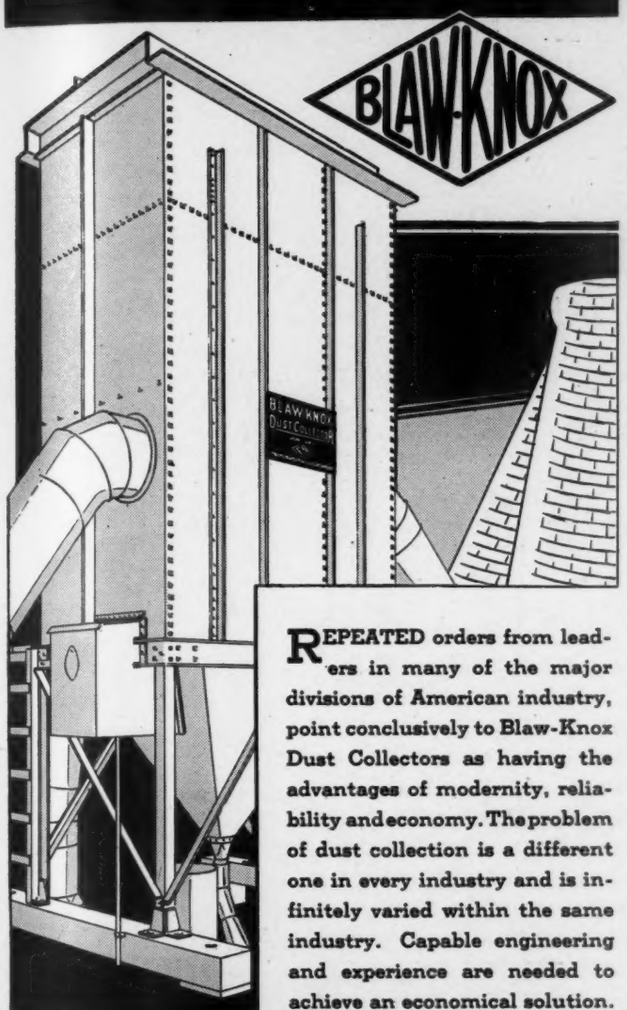
WHAT portion of your "Power Dollar" goes for useless friction-producing gadgets—those odds and ends hung here and there about the screen like Christmas tree decorations? The actual figures would surprise you. The extreme simplicity and lack of power-consuming gadgets make The Late Model UNIVERSAL Super-Vibrators most economical in power consumption. They have the "pep" and "action" necessary to keep the mesh clean and free from blinding—they operate smoothly and quietly without attention. Our free catalog shows why. Write for it at once.

NRA MEMBER U.S. WE DO OUR PART

DO YOU KNOW THAT THE PERCENTAGE OF REORDERS IS UNUSUALLY HIGH?

UNIVERSAL VIBRATING SCREEN CO.
RACINE - - - - - - - WIS.

DUST COLLECTORS

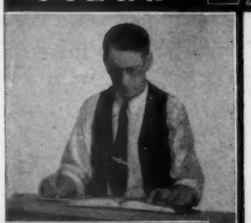


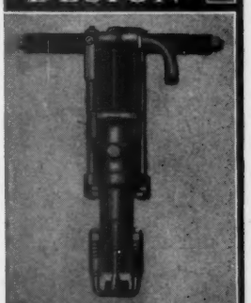
REPEATED orders from leaders in many of the major divisions of American industry, point conclusively to Blaw-Knox Dust Collectors as having the advantages of modernity, reliability and economy. The problem of dust collection is a different one in every industry and is infinitely varied within the same industry. Capable engineering and experience are needed to achieve an economical solution. Blaw-Knox engineers are specialists in this work—they decide quickly and without hesitation on the character of installation to fit the need. Such service is free from obligation to anyone having dust problems and you will gain through receiving Blaw-Knox advice.

BLAW-KNOX COMPANY
2035 Farmers Bank Building
Pittsburgh, Pa.

SUBMIT YOUR DUST PROBLEMS TO BLAW-KNOX *for solution*

BLAW-KNOX





GARDNER-DENVER S-55 SINKER

PERFECTLY BALANCED DESIGN....

The greatest drilling capacity—PLUS the easiest riding—PLUS conservative air consumption.

That is what is meant by "perfectly balanced design" in the Gardner-Denver S-55 Sinker.

But let's put it in terms of YOUR job. With the S-55, you can drill *faster* than with any other drill of its class—a fact proved by wide experience. Your men can use the S-55 *continuously* because it is so free from vibration—you make greater daily progress. Your cost sheets will reflect the S-55's remarkably low air consumption as well as its freedom from maintenance.

The S-55 is the most popular 55-pound drill on the market today because it is designed *to fit field conditions*. Write us and we will send a representative to demonstrate it—no obligation on your part.

GARDNER-DENVER CO., 104 Williamson St., Quincy, Ill.

Horizontal, Vertical, Air-Cooled and Portable Compressors • Steam and Power Pumps
Rock Drills, Accessories • Paving Breakers • Clay Diggers • Hoists

GARDNER-DENVER

MAKES AIR DO MORE AND COST LESS

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment For Sale

BARGAINS
Special Extra

5—21-ton 11x16" Vulcan 36" gauge 4-wheel saddle tank locomotives, Code boilers, built 1923.

2—21-ton 11x16" Porter 36" gauge 4-wheel saddle tank locomotives, Code boilers, built 1921.

1—21-ton 11x16" American 36" gauge 4-wheel saddle tank locomotive, Code boiler, built 1922.

75—4-yard WESTERN 36" gauge steel under frame 2-way side dump cars, box-door type.

All purchased recent Court Sale at Edgefield, South Carolina. Immediate shipment. Thoroughly rebuilt since last used.

BIRMINGHAM RAIL & LOCOMOTIVE CO.
Birmingham, Alabama

FOR SALE
JAW CRUSHERS — 4"x8"-7"x11"-8"x14"-9"x15" - 10"x16" - 6"x20" - 11"x22" - 12"x24" - 13"x30" - 15"x30" - 18"x30" - 18"x36" - 20"x50" - 28"x36" - 30"x30" - 26"x42" - 36"x48" - 42"x60" - 42"x48".
Crushing Rolls—16"x10" up to 54"x64".
Gyratory Crushers—From No. 3 up to No. 12.
No. 0-No. 1 and No. 2 ring roll mills.
No. 0-No. 1—No. 1½ and No. 2 rotary fine crushers.
Swing hammer mills.
3'x25'-4'x30'-5'x50'-5½'x40'-6'x50' direct heat rotary dryers.
4'x30' - 4½'x26' - 5'x30' semi-indirect heat rotary dryers.
Indirect heat and steam heated air rotary dryers.
Rotary cement kilns 3' to 8' diameter.
Hardinge-Marcy and Fuller-Lehigh mills.
No. 0000-No. 000-No. 00-No. 0 Raymond Mills.
One 6'x8' Traylor ball mill.
5'x12' and 4'x10' rod mills.
Tube mills from 4' to 7' in diameter.
8'-10' and 12' air separators.
Hummer - Sturtevant - Gyrex and Niagara screens.
Hoist—Air compressors—Cranes & Shovels.

W. P. HEINEKEN, Engineer
95 Liberty St., New York Tel. Barclay 7-7298

FOR SALE
Farrell 18x36 Jaw Crusher, type B.
Reliance 8x14 Jaw Crusher.
Sauerman 100' Steel Mast and 1-yd. slackline bucket.
Belt Conveyor, 20" wide, 100 to 200' long.
Conveyor Belt, 14" to 36".
Belt Elevator with 30" buckets, 80' high.
Jeffrey No. 3 Limepulver, Jaw Crusher and Pulverizer.
Telsmith Revolving Screen, 40"x20'.
Telsmith 2-deck Vibrating Screens, 3x6' and 3x8'.
4" Centrifugal Pump with 4-cyl. gas engine.
Chainhoists, 1½ to 10 tons.
3,000' 24" gauge, 20-lb. track, switches & cars.
Goulds' 8x6" Centrifugal Pump, 22 HP., A.C. motor.
New 75' steel Derrick Boom in 3 sections.

G. A. UNVERZAGT
15 Park Row New York City

1—2-yd. MARION 480 Shovel-Crane.
1—2-yd. Bucyrus 50B Shovel.
1—1¼-yd. BYERS Crane.
1—1-yd. OSGOOD Shovel-crane.
1—1-yd. KOEHRING Crane.
1—1-yd. P. & H. 600 Shovel.
1—¾-yd. P. & H. Shovel-crane.
1—½-yd. BYERS Shovel-crane.
30—4-yd. Heavy Steel Stone Skips.
1—265-ft. Gas Portable Compressor and Jackhammers.
Electric Draglines, 2- and 3-yd.
Gasoline Draglines, ½- and ¾-yd.
1—BROWNING Truck-crane.
24" Conveyor 65 and 170 ft.
Clamshell Buckets, ½ to 1½ yd.
Crushers 10x18; 15x38; 18x30; 11x26; 12x20.

J. T. WALSH
500 Brisbane Bldg., Buffalo, N. Y.

FOR SALE
1—Pennsylvania Hammer Mill—type SX-6, equipped with manganese parts thruout.
1—Williams Hammer Mill—type 4-B.
1—Farrell Jaw Crusher—13" x 30".
1—Farrell Jaw Crusher—10" x 16".
1—Symons Disc Crusher—24".
1—Ingersoll-Rand Compressor—ER-1, 12x10.
1—Sturtevant Vibrating Screen—Moto-Vibro—double-deck—type 1-MV, 3' x 6'.
1—Link-Belt Vibrating Screen—single-deck—3' x 6'.
1—Worthington Duplex Piston Pattern Pump 9 x 5¼ x 10.
2—Worthington Duplex Piston Pattern Pumps—3½ x 2¾ x 4.
This equipment to be sold direct and not through second-hand equipment dealers.

Limestone Products Corporation of America
Newton, N. J.

CARS
12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo.
101 West 31st St. New York

DRAGLINE & SLACKLINE EQUIPMENT
New and Used
COMPLETE OUTFITS OR UNITS SEPARATE
Send me your inquiry. I can save you money.

SAMUEL NAFZIGER
159 No. State Street CHICAGO, ILL.

Marion Gas Electric ¾-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler—saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.

SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

FOR SALE
Two No. 2 and No. 4 Austin Gyratory Crushers, mounted. One 8x8 Curtis Air Compressor. One 10x12 Ingersol Rand Air Compressor, steam driven. One No. 12 Adams Road Grader. Three 1½-yd. Euclid Maneys for Caterpillar. One No. 21 Adams Grader-Tractor Hitch. One 36"x12' Revolving Screen. DEAN BROS., Batesville, Ind.

FOR SALE
ALLIS-CHALMERS 10" STYLE "B" NEWHOUSE CRUSHER COMPLETE
IMPROVED CONCAVES
FIRST CLASS CONDITION
Purchasing Department
BOUND BROOK CRUSHED STONE COMPANY
P. O. Box 429, MORRISTOWN, N. J.

ELEVATOR BUCKETS
Antifriction Belt Conveyor Idlers.
Complete conveyors & Bucket elevators.
Quality—Lowest price.

EXCELSIOR MACHINE COMPANY
Engineers & Machinists
READING, PENNA.

FOR SALE
2—3- and 5-roll Raymond High Side Mills.
4—Ruggles-Coles Class A Rotary Dryers—4x20', 5x26', 5x30', 8'-8"x85'.
1—7'x20' Silex Lined Tube Mill; Hardinge.
1—8'x22' Kennedy Iron Lined Tube Mill.
4—6'x30' Rotary Steam Tube Dryers, each 1,300 sq. ft. heating surface.
1—36x36" 4XC Gruendler Swing Hammer Mill.
1—36x24" Jeffrey Type D Hammer Mill.
1—40x36" Williams No. 6 Universal Hammer Mill.
12—Jaw Crushers—24x36, 36x30, 42x60 Farrel; 36x42, 42x48, 30x60 Traylor; 56x72 Buchanan; 42x40, 48x60 Allis-Chalmers.
5—Symons Cone Crushers—2 ft.; 5½ ft.; 2—7 ft.
1—No. 50 Ingersoll Rand Drill Sharpener.
9—Crushing Rolls—8x5, 20x14, 36x16 Sturtevant; 30x10 Colorado Iron Works; 36x16, 42x16 Allis-Chalmers; 36x16, 42x16 Traylor.
5—Air Separators—30", 10', 12', 14'.

Send for Bulletin No. 15, listing all sizes and types Jaw, Gyratory and Roll Crushers, Swing Hammer Mills, Elevators, Belt Conveyors, Rotary and Vibrating Screens, Rotary Kilns and Dryers, Raymond and other fine Pulverizers, Air Separators, Hardinge Ball and Pebble Mills, silex and iron-lined Tube Mills, Shovels and Cranes, etc.

CONSOLIDATED PRODUCTS CO., INC.
17-19 Park Row, New York City Barclay 7-0600
Shops and Yards at Newark, N. J., cover six acres.
WE WILL BUY YOUR SURPLUS MACHINERY.

USED EQUIPMENT WANTED

WANTED
1—40-foot drag line boom and attachments with a one-yard drag bucket for No. 450 Marion Electric Shovel.

3 or 4 side dump, standard gauge, six-yard cars.

State price and location of equipment as we wish to have opportunity to inspect before making purchase.

Address Box 644, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

CLASSIFIED ADVERTISEMENTS

USED EQUIPMENT WANTED

WANTED—A TUBE MILL 5' x 20' or approximate. Give location, history and lowest cash price f.o.b. cars.

Reply to **Box 643, care of Rock Products, 330 South Wells St, Chicago, Ill.**

WANTED

Two Tubemills—State price, complete specifications, whether motor and drive available. Current characteristics must be 60 cycle, 3 phase, 440 volt.

Address Box 647, care of Rock Products, 330 South Wells Street, Chicago, Ill.

WANTED

A 12' or 14' AIR SEPARATOR. Must be in good condition and priced right.

Reply to Box 645, care of Rock Products, 330 South Wells Street, Chicago, Ill.

WANTED

Jaw Crusher, 36" x 48".

MASS. BROKEN STONE CO.
Box 246, Waltham, Mass.

WANTED

Shell, runner and wearing plates for Amsco ten-inch pump.

Address Box 646, care of Rock Products, 330 South Wells Street, Chicago, Ill.

POSITIONS VACANT

CRUSHER SALES ENGINEER—MODERN, well established line primary and secondary crushing machinery for light and heavy duty. Cement rock, limestone, gypsum, coal and miscellaneous crushing. Territory in East. State age, education, experience, references, salary, church. Address Box 648, care of Rock Products, 330 South Wells St., Chicago, Ill.

BUSINESS OPPORTUNITIES

FOR SALE

A going Limestone Quarry and plant now operating in Southern Ohio on two railroads. Owners in other business. Will sell at sacrifice.

Address—Rock Products,
Box 639, 330 South Wells St.,
Chicago, Ill.

Wish to communicate with crushing concerns having crushers not suited to blocky rock formations. I have a method that enables the small operator to produce at a cost favorable with that of the concerns using heavy crushing equipment.

W. E. SMITH
737 Tonowanda St., Buffalo, N. Y.

FOR SALE OR LEASE

Limestone Quarry and Plant, fully equipped, located on B.&O. and Western Allegheny R.R., near Savannah Church, Shenango Township, Lawrence County, Pa. If interested, address **SHENANGO LIMESTONE CO., Leetonia, Ohio.**

POSITIONS WANTED

LIME PLANT SUPERINTENDENT desires a permanent connection; 20 years' experience in operating lime plants, limestone quarries, and crushing plants; also have years of experience in the burning of lime, hydration, and construction. Efficient and successful handling of equipment and labor. First-class mechanic. Experience in the clerical functions in plant costs. Excellent references. Address Box 638, care of Rock Products, 330 South Wells St., Chicago, Ill.

CHEMICAL ENGINEER, CHEMIST, MINeralogist—Nine years' technical and practical service to lime and gypsum industries, involving calcination, hydration and precipitation problems, developing new and improving old products, sales promotion, core drill surveys, plant construction and supervision of operation. Available for employment. Address Box 642, care of Rock Products, 330 South Wells Street, Chicago, Ill.

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
38 Doane Street, Boston, Massachusetts.
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation	Design
Examinations	Construction
Reports	Supervision

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

DIAMOND CORE DRILLING

CONTRACTORS
FIRECLAY, ASPHALT, LIMESTONE, COAL AND ALL MINERALS
Light Gasoline Outfits
MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.

H. D. RUHM

Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $2.50 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

POSITIONS WANTED

CEMENT MILL ENGINEER WITH 20 years' experience in the design, construction and operation of cement mills. Experienced with most problems encountered in efficient operation of mills. Desires connection either permanent or on special work in the cement or allied industries. Address Box 635, care of Rock Products, 330 South Wells St., Chicago, Illinois.

WANTED—A POSITION AS SUPT. OR manager of lime or crushing plant. Have had 17 years' experience, last 10 years as supt. with one company. Can furnish good references as to honesty and ability. Available now to go anywhere. Address Box 637, care of Rock Products, 330 So. Wells St., Chicago, Ill.

MAKE YOUR WANTS KNOWN

ROCK PRODUCTS is the business journal of the rock products industry, its readers are men of influence, and their buying power is big. An advertisement in this classified department will be seen and read. Make your wants known and see how quickly they will be satisfied.